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# NATIONAL CAR BUILDER

VOLUME XII. NUMBER 7. JULY, 1881. CHICAGO: 144 N. Clark Street.

NEW YORK:		CHICAGO:	
Published at 5 and 7 Bay St.		144 N. Clark Street.	
DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.			
ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS MAIL MATTER OF THE SECOND CLASS.			
\$1.00 PER ANNUM. SINGLE NUMBERS, TEN CENTS.			
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Wellington Bros. & Co., Agents, Boston (cover)	2	Crane Brothers Manufacturing Co., Chicago, Ill.	11
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This Paint is used by nearly all the Railroads in the Country.

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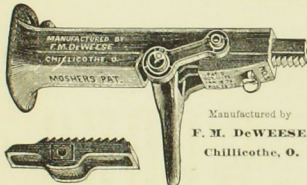
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The best Paint in the World for  
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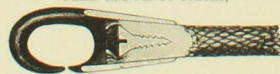
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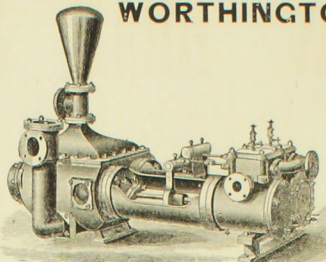
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Both these articles have had large success with the Bedding  
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Patented April 30 and De-  
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This Wire contains six times as many Barbs per foot as any other, and is the only Fence that is as efficient against  
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[JULY, 1881.]

THE NATIONAL CAR-BUILDER.

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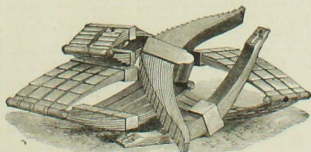
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# THE CONTINUOUS DRAW-BAR CO.,

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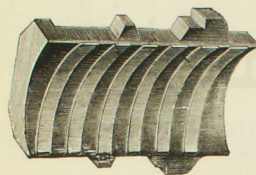
We sell Railroad Rights for their valuable Continuous Draw Bars for Passenger and Freight Cars, which are now so rapidly superseding the old drawing attachments. We have purchased and now control the following patents: Allen Middleton, Phila.; 2 patents; Griffin & Patterson, Cincinnati, Ohio; J. Caum, Phila.; and D. Holt, Albany, N. Y. Upward of 30,000 cars, including those of the leading trunk lines of the country, have already been equipped with these draw-bars, and they are every day becoming more popular. Their application saves railroad companies from 20 to 40 per cent. in first cost, and not less than 50 per cent. in daily running repairs.

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Has the **SOLE RIGHT** to manufacture and sell **JOURNAL BEARING BRASSES** under Letters Patent issued to V. Leroy, Nov. 18, 1879, and renewed Feb. 17, 1880. Testimonials, which may be seen at the office of the Company, show our brasses to be the Best and Most Economical in use. We claim that their use saves one-third in oil, and two sets will outwear three of any other brasses. Those interested in Railroads will do well to examine. We will furnish sets for trial at our cost, if a fair trial is guaranteed. Address

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**PATENT LEAD-LINED SELF-FITTING JOURNAL BEARINGS,**  
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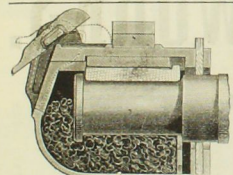
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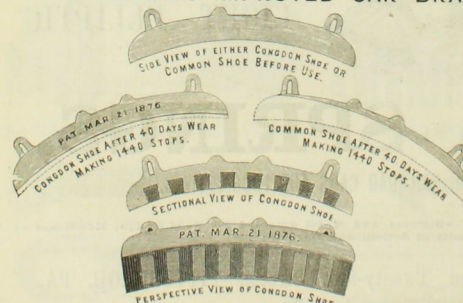
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We respectfully refer you to the following railroads using the Hewitt Cover  
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This improvement consists of a shoe, having imbedded in its body of cast iron, pieces of wrought iron, steel, malleable iron, or other suitable metal, fixed therein so as to appear in sections on the wearing surface of the shoe, which increases surprisingly its resistance to wear, and adds materially to the friction or adhesion of the shoe to the surface of the wheel. These shoes are now in extensive and general use on many prominent railroads, and are effecting a saving of over fifty per cent.

Communications should be addressed to either of the following parties: **THE CONGDON BRAKE SHOE CO., GRAND PACIFIC HOTEL, CHICAGO; RAMAPO WHEEL & FOUNDRY CO., RAMAPO, N. Y.; J. H. BASS, CHICAGO; BASS FOUNDRY & MACHINE WORKS, FORT WAYNE, IND.; ST. LOUIS CAR WHEEL CO., ST. LOUIS, MO.**

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About 2,000 of them are at work on the E. & T. H. C. & E. I. C. R. I. & P. T. H. & I. railroads since Dec. 1. The two first named roads have adopted it wholly for their freight cars. This coupling carries its own "Shock" and with it the "Bosses" can couple cars with their "Kids" on Full size working models at W. V. PERRY'S (General Agent), 234 South Clark Street, Chicago, Ill.

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We represent here a cut of our Corn pound

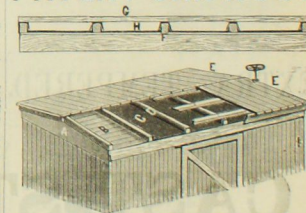


**Lever Jack,**

OF GREAT POWER.

Its capacity is 12 to 15 tons with two men.  
We make out one size, a two-inch round bar.  
Height, 29 inches.

## WINSLOW'S PATENT CAR ROOF



A Carline or Main Rafter. B Sub or under boarding. C Asphalt Felt, and when on Car painted with imperishable Asphalt paint. D Felt Cap or Sub Rafter. E Upper board roof. F Sub Rafter. G Stringers on Sub Rafter. H Air Space between the Felt and upper board roof.  
This roof must come into general use by Railway Companies and Manufacturers of Stock and Freight Cars for two reasons, **CHEAPNESS** and **DURABILITY**, as it can be furnished on the cars at the cost of a first-class double board roof, and is more durable than the best metallic roof, being thoroughly protected by the upper and lower boarding and the FELT, which is treated in its manufacture with ASPHALT and painted with the same imperishable material, which, not being affected by either heat or cold, must last the ordinary life of a car.

MANUFACTURED BY

**A. P. WINSLOW & CO.,**  
CLEVELAND, OHIO.



[JULY, 1881.]

[JULY, 1881.]

THE NATIONAL CAR-BUILDER.

iii

LOWE'S METALLIC PAINT COMPANY,  
CHATTANOOGA, TENNESSEE,  
MANUFACTURERS OF

# LOWE'S METALLIC PAINT!

This Paint has now been before the public sufficiently long to establish its qualities as first-class Metallic Paint in every respect. It has covering properties superior to any other Metallic Paint made.

It takes about 18 per cent. less Oil than any other Metallic Paint.

It is absolutely free from Sulphates of every kind and description, which in many other Metallic Paints prove so injurious to Iron and Tin Roofs. It is not calcined nor burnt, consequently its color is unchangeable. It is manufactured in a very superior manner by using re-ground and carefully prepared, and is entirely available for inside finish when dark colors are desired. Its natural color is a Uniform Dark Blood Red. It is

Warranted not less than 55 per cent. Metallic Iron,

thus giving it a body excellent by no other Paint made.

Its Fire Proof properties are excellent, and houses constructed of wood, and especially shingle roofs, are very materially protected by application of this Paint. It is not calcined nor burnt, consequently its color is unchangeable.

We have Freight arrangements to nearly every city in the United States and Canada, and would name Prices delivered.

Please read the Certificates hereto attached.

East Tennessee, Virginia & Georgia Railroad—Main Stem,  
Office of General Superintendent,  
Knoxville, Tenn., April 18, 1881.

S. B. Lowe, Chattanooga, Tenn.:  
Dear Sir:—I will say that this company is using it both upon its Main Stem and side, and has found it perfectly satisfactory, and equal to any Lehigh Brown that we have used. It mixes well and spreads smoothly, and I find it much the cheapest paint that I can use for freight cars and such purposes. Very truly yours,  
JNO. F. O'BRIEN, Gen'l Supt.

Wilkins, Post & Co., Engineers and Bridge Builders,  
Atlanta, Ga., and 102 Broadway, N. Y.,  
Atlanta, May 16, 1881.

S. B. Lowe, Chattanooga:  
Dear Sir:—We have been using your paint on all the iron bridges that we are constructing on the M. & C. Georgia Western, and other railroads through the South, and find it of very superior quality requiring less oil and working with ease, and having excellent covering properties. Respectfully,  
WILKINS, POST & CO.

Office of Peaseley, Gaulbert & Co., Manufacturers of  
White Lead, Colors, Ready Mixed Paints, etc.,  
Louisville, Ky., April 15, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:  
Dear Sir:—Your Metallic Paint has given perfect satisfaction wherever we have placed it. In gridding we find it takes from ten to twenty five per cent. less oil than various other brands of oxide of iron we have heretofore handled. Very truly yours,  
PEASELEY, GAULBERT & CO.

King's Iron Bridge & Manufacturing Co.,  
Cleveland, O., May 23, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:  
Gentlemen: We find your paint of first-rate quality for our use, and very economical. Yours truly,  
KING BRIDGE CO.

Manufacturers of Scott's Sheet Iron Roofing,  
Cincinnati, May 4, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:  
Gentlemen: We consider it as good as any that we have used during our experience of over nine years, and shall use it largely. Yours, etc.,  
SCOTT & CO.

W. G. Hyndman & Co.,  
Manufacturers of Patent Sheet Iron Roofing,  
Cincinnati, May 3, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:  
Gentlemen: The paint which we received from you last month has given us perfect satisfaction. We regard it as the best iron ore paint that we have ever used. Respe. truly yours,  
W. G. HYNDMAN & CO.

P. S.—Please forward us immediately two (2) tons more on our order.

Wason Car and Foundry Co.,  
Chattanooga, Tenn., May 3, 1881.

S. B. Lowe, City:  
Dear Sir:—For some time past we have been using the Lowe Metallic Paint upon all the cars built at our shops, and, as it gives entire satisfaction to our customers, it is our purpose to continue the use of it. F. F. MORRILL, Sec'y.

Cincinnati, Hamilton & Dayton R. R. Co.,  
Operating the  
Dayton & Michigan, Cin. & Richmond & Chicago,  
and C. H. & L. R. R's.

W. H. H. Allison, Master Car-Building,  
Cincinnati, June 14, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:  
Gentlemen: We have been using your Metallic Paint on freight cars, at our shops, for the last four months, and find it a better paint than we ever used for that purpose. Yours respectfully,  
W. H. H. ALLISON.

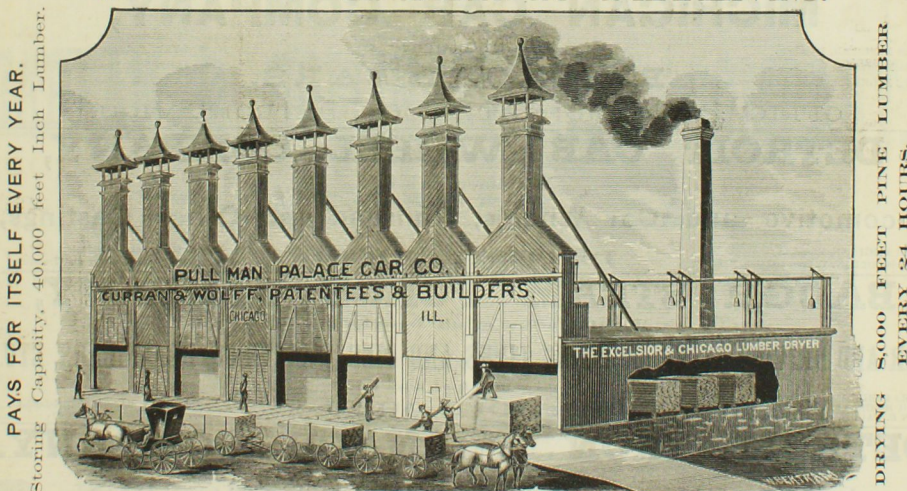
Laboratory of Fred P. Dewey,  
Chemist to Roane Iron Co.,  
Chattanooga, Tenn., April 6, 1881.

S. B. Lowe, Esq.:  
Dear Sir:—I have given samples of your paint ore a careful analysis with a special view of ascertaining if there is any substance in it calculated to prove injurious to tin or iron roofs, and am free to say that I find it remarkably free from sulphides of every kind, or anything else that could prove injurious to either tin or iron roofs. Yours respectfully,  
FRED P. DEWEY, Ph. B., Analytical Chemist.

Office of Norton & Wieder,  
Paints, Oils, Varnishes, Glass, Sash, Doors and Blinds,  
St. Louis, May 30, 1881.

Lowe's Metallic Paint Co., Chattanooga, Tenn.:  
Gentlemen: We have used and sold—in the course of the past year—enormous quantities of your Metallic Paint, and we find that less oil is required for yours than for other Metallic Paints. Yours truly,  
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C. & S. W. Railroad, Chicago.....	Indiana Car Company, Cambridge City, Ind.....	Massett Car & Foundry Co., St. Louis.....
Platt & Pere Marquette R. R., Saginaw.....	Haskell & Barker Company, Michigan City, Ind.....	Hain Bros., Huntington, Pa.....
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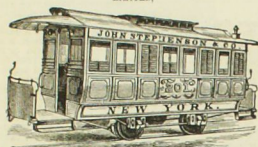
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[JULY, 1881.]

THE NATIONAL CAR-BUILDER.

v

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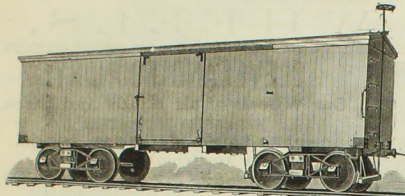
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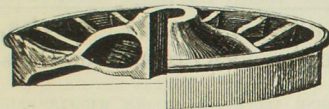
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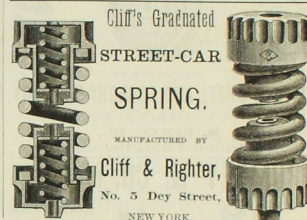
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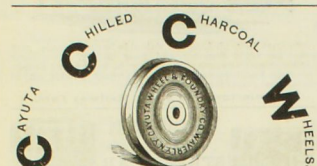


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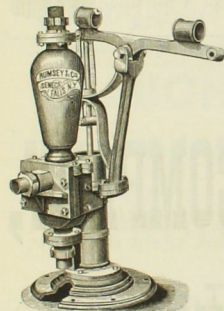
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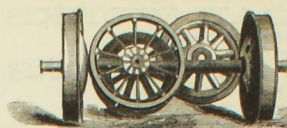
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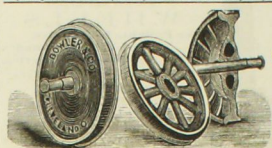
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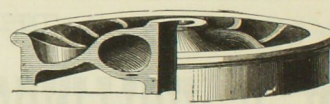
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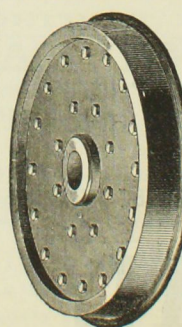
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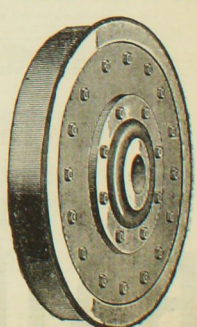
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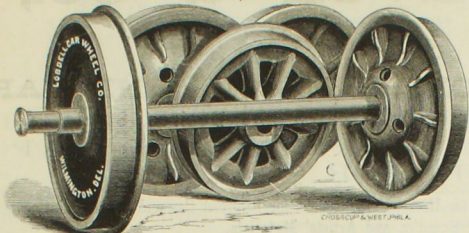
JULY, 1881.]

THE NATIONAL CAR-BUILDER.

vii

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Single and Double Plate and Hammered Wheels for Steam Roads. Also Solid and Open Plate Wheels for Street Roads. Wheels with Turned Threads, under the Patent of "W. W. Lobdell."

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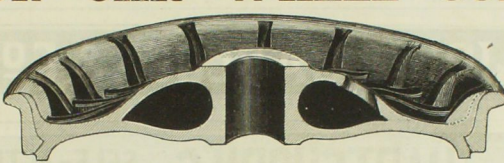
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"Self-Operating," "Socket," Circle and Lug, "Nail Proof" and Bissell & Miller Patents.

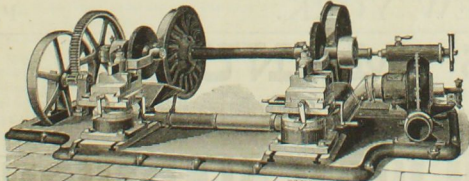
VAN LIEW'S OUTSIDE CAR DOOR HANGER.

ARTHUR M. WAITT, General Agent. D. F. VAN LIEW, Patentee, Box 172, Aurora, Ill.

REFERENCES: The many thousands of Cars equipped during the past 5 years on roads such as C. & N. W., P. F. W. & C., Grand Trunk, Mo. Pa., Penn. Co. & Lines, C. & A., A. T. & S. Fe. Wab. St. L. & P. K. P., all of Mr. Nettleton's K. C. roads, C., St. P. M. & O. C., R. & Q., J. B. & W., L. & W., L. D. & S., C. & E. L. C., R. I. & P., &c.

"N. B.—All work must be made from my standard patterns, which will be promptly and cheerfully furnished.—D. F. V. L."

## CHILLED CAR-WHEEL GRINDING COMPANY, CARSON NEV.



P. O. BOX 882, CHICAGO.

Patented in United States and Canada by J. H. GOWAN.

A chilled Car Wheel, true to our method, cannot be excelled by any steel-tired wheel. We guarantee that our machine will true ten pairs of car wheels per day of ten hours. Average cost of grinding per new wheel is 8 cents, per old wheel, 16 cents. These machines are used by, and reference is made to, the following roads: Chicago & Northwestern; Chicago, Rock Island & Pacific; Central Pacific; Denver, South Park & Pacific; Virginia & Truckee; South Pacific Coast; Nevada County. H. M. VEILINGTON, President. J. H. GOWAN, Superintendent. HARRY RUSTEN, Vice-President. C. P. MASON, Secretary.



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Our Specialty. For sale by all the principal Metal Dealers in the large cities throughout the United States, and at their offices. 111 Water Street, Pittsburgh, Pa.

DURABILITY.—With these advantages of material and construction,—embracing the tenacity, hardness, and durability of the Best Cast Steel-Tired Wheels—we claim that they will do as much hard work as any Steel Wheel now in use, and with less danger to life and property, and are ready to guarantee them to that end.

USES.—They are adapted to any service and to all places where Steel Tired or the ordinary Chilled Wheels are used, while the Cost (being on a small per centage over chilled wheels), compared with their mileage, makes them the cheapest Wheels on the face of the globe.

WORKS:  
Allston, Mass.

## HARRISBURG

## CAR MANUFACTURING COMPANY

MANUFACTURE

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AND ALL OTHER KINDS OF

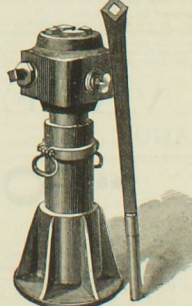
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Railroad Car Wheels and Castings, Bridge and Rolling Mill Castings, Bridge Rods, Bolts and

## RAILROAD FORGINGS.

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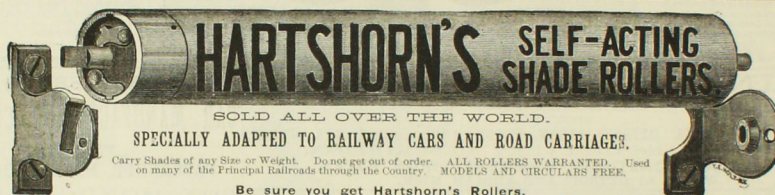
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**THE INTERNATIONAL EXHIBITION MELBOURNE, 1881.**

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We have been pleased to receive the following announcement from our representatives in Melbourne, Australia:

MESSRS. VALENTINE & CO., NEW YORK:

GENTLEMEN: By this we have the pleasure to inform you that your exhibit of Varnish has the honor to rank in the highest place in our International Exhibition, and stands alone for the first Order of Merit for Varnish by itself without any other goods to help it; and it is the only Varnish that has obtained *First Order of Merit* against all comers. We congratulate you upon the position you take, for the competition was great. Some of the English makers have magnificent shows, got up regardless of expense, and you may fancy we have been interested in the result, but were content; and what makes it more valuable is the fact that it is the only *First Order of Merit* for Varnish alone, which was secured without your Varnish being exhibited in connection with other goods, to make the exhibit more attractive to the eye.

Yours truly,

(Signed) HENRY BOX & SON.

**VALENTINE & COMPANY,**

CHICAGO.

NEW YORK.

PARIS.

## "POOR'S MANUAL"

OF THE RAILROADS OF THE UNITED STATES FOR 1881.

Containing Detailed Statements of the Operations and Condition of every Railway Company in the Country. In one Volume, 1,300 Pages, Cloth, Royal Octavo. Price \$5 per copy. The "Manual" also contains a Directory giving the names and addresses of the Leading Manufacturers of Railway Material. Superintendents and Purchasing Agents will find this a very valuable work of reference when purchasing supplies.

ESTABLISHED 1845.

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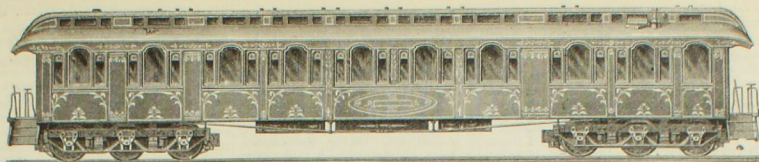
NEWARK, N. J.

**RAILWAY VARNISHES**



[JULY, 1881.

# THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XII;  
NUMBER 7.

JULY, 1881.

(SINGLE NUMBERS, TEN CENTS,  
\$1.00 PER ANNUM.)

## Miscellaneous Items.

THE improved coiling machines used by Cliff & Righter, railway car spring manufacturers, of New York, have more than doubled the capacity of their works.

THE Cincinnati Southern Railway has 54 engines, 40 passenger train cars, and about 2,000 freight cars of all classes.

THE Chicago & Northwestern Railway Co. is building an additional paint shop at west Chicago, dimensions same as present one, 300x80 feet.

THE Erie Car Works (Erie, Pa.) in order to insure good iron for their wheels and car castings, are building a blast furnace at Point St. Ignace, Mich. to which place the ore will be brought by steamer or rail from the mines.

THE Mobile & Ohio R. R. Company is employing a large force of men in the grading of the extension from Columbus, Ky., to Cairo, Ill., at which point a connection will be made with northern roads by crossing the Ohio river.

THE Cleveland Bridge & Car Works have built a "whale" car consisting of two coupled flat cars carrying a frame and canvas covering. It carries the embalmed remains of one of Jonah's friends for exhibition in the rural districts.

THE Illinois Central road is building at its Weldon shops, Chicago, ten mogul engines with lime filters and crown sheet washer. These improvements originated at these shops, and since their application, the fire-box repairs of engines have been reduced more than fifty per cent.

AT Cairo, Ill., many railroad improvements are in progress, including a large union depot, nearly completed, to be used by the Cairo & Vincennes, Mobile & Ohio, Iron Mountain & Southern, and probably Cairo & St. Louis narrow gauge. A new incline and transfer boat are being built at a cost of \$50,000 to facilitate the crossing of both the Ohio and Mississippi rivers at that point.

A NEW style of summer observation car, of a very light pattern, has been introduced on the Pennsylvania Railroad. The carriages are painted a light stone color, of the street-car pattern, and are inclosed with windows, with guard platforms on either end. They are to be attached to all day-light trains to and from Pittsburg over the great western division of that road.

THE Burlington & Southwestern road has used for two years a grain door devised by the master car-builder of the road, Mr. A. B. Allen. It is in two sections, the lower one being used when the car is loaded with wheat or other heavy grain, and both, when loaded with oats or corn in the ear. It is made of slats wired together so as to be flexible and slide up under the roof. Shippers and elevator men like it very much.

POST & COMPANY, of Cincinnati, manufacturers of car trimmings, lamps and other railway supplies, at Ludlow, Ky., employ 225 men, and are full of orders. They have recently brought out

some new and beautiful designs in lamps, racks, sash-locks, etc., that are decided improvements upon existing styles and patterns. A new 100-horse power Corliss engine has been contracted for; which will considerably increase the present capacity of the works.

THE Louisville (Ky.) Steam Forge Co., a new organization, has erected substantial buildings in that city, on the line of the Louisville & Nashville Railroad, and fitted them up with the best machinery and appliances. The vice-president of the company, Mr. Warner Green, was for several years secretary of the Louisville Car Wheel Mfg Co., and Mr. Jacob Losey, the superintendent, has had a large experience as a railway master mechanic.

THE Denver and Rio Grande Railway Co. is making extensive additions to its shops at Denver to meet the increasing demands of traffic in the repairing and construction of rolling stock. The shops have recently turned out 20 refrigerator cars, 23 baggage and express, 8 mail, 10 combination, and 15 cabooses. In addition to these, 3,500 freight cars are to be built at these shops. A force of 800 men is at present employed. There are 110 engines now running on the road, and all the passenger cars are equipped with air brakes.

THE Terre Haute (Ind.) Car Company, in order to provide facilities for its increasing business, has purchased 26 acres of land in the southern part of the town on the line of the Chicago & Eastern Illinois R. R., upon which a wood machine shop 120x150, and an erecting shop 120x230, have already been erected. The roofs and sides are covered with sheet iron, and painted with Cleveland iron clad paint. A foundry and some additional buildings are to be completed before next winter. The works employ 375 men, and have contracts in hand for 1,350 freight cars of different kinds.

THE Ohio Falls Car Co., Jeffersonville, Ind., has contracts for over 100 passenger cars and a large number of freight cars. All are built in accordance with specifications, and there is a noted absence of new inventions and devices in the details of construction. The special car built at these works some months ago for the president of the Minneapolis & St. Louis road is again in the shops to undergo some internal changes. The Company has an order to build a duplicate of it for the Louisville & Nashville road. Preparations are being made to enlarge the capacity of these works to meet the anticipated future demand for cars from western and southwestern roads.

THE New Albany (Ind.) Steam Forge Co. is full of work, and is turning out 80 car axles a day. Some of them are made of two parts old axles and one part scrap. Two of these were recently tested. The first one deflected 5 1/2 in. under three blows of a 1,640 lb. drop, falling 10 feet, 7 1/2 in. under three blows at 15 feet, and broke at a blow at 25 feet. The second did not break under three 10, and two 15 ft. blows. Axles of sheet iron and boiler plate rolled into muck bar and hammered, stood three 10 feet blows of 1,500 lb. drop, and three

at 15 feet without fracture. One axle, after two 10 and one 15 ft. blows, was bent in a wheel press, until the ends were four feet apart, when it showed a fracture. The company is putting up a new hammer shop for heavy work; also shears for cutting 4-inch square bar.

THE Chicago and Eastern Illinois road is building a new machine shop and round-house at Danville. They will be heated by steam from two locomotive boilers. The company has adopted as standard freight engines, the Hinkley mogul style, with some added specifications by Mr. Cook, the master mechanic of the road. The cross-heads and guides are provided with sheet iron covers, hung on hinges, so they can be turned back out of the way when desired, but when in place, are a great protection against cinders and dust, and effect a large saving in oil. In the car department some new freight cars are in process of construction, and also a passenger coach, with walnut and oak finish. The standard coal car of the road has a box 30x8 ft., and is 3 ft. high, weight 18,300 lbs., nominal capacity 20 tons; 45 of these cars, loaded, aggregate 1,310 tons, and are a load for a mogul engine.

THE Chicago, Rock Island & Pacific road is building, at its Chicago shops, five coaches and a smoking car for suburban traffic. The bodies of the coaches are 42 ft. 6 in. long and 9 ft. wide, and will seat fifty passengers. The seats are arranged like those in the cars of the elevated roads in New York City, with twelve cross-seats in the middle and sofas at the sides between them and the ends. The seats and backs are covered with Hale & Kilburn's rattan canvas, the inside finish is oak and mahogany, the canvas head-linings are an excellent imitation of decorated oak, and are put up with mahogany mouldings. The body construction is light and strong, and with the heavy standard passenger trucks of the road, the entire weight of the car is about 30,000 pounds. The clear-story is five feet wide. The smoking car is 30 ft. 6 in. long; they are also building two postal cars of the same length.

THE increased number of hot boxes in locomotive trucks, incident to the additional weight of the extended front end spark arrester, now being used on the New York Central, has led Mr. Watkeys, the master mechanic at Syracuse, to make some improvements in his trucks. Besides making them heavier in proportion to the greater weight to be carried, he has inserted plates between the ends of the equalizers and the journal bearings. Each plate has a convex rib on the top which fits a concave recess across the end of the equalizer. The under face of the plate has a concave recess to fit another convex rib across the middle of the journal bearing. These two bearing surfaces being at right angles to each other, they serve to maintain at all times a central bearing upon the journal brasses, no matter how much rocking or swinging there may be from uneven track or other causes. The success of this is demonstrated by the equal wearing of the brasses at both ends as well as by their

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JAPAN.

JAPANS

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This will insure DURABILITY  
chemical relationship, when in  
COLOURS.

W YORK.

NO. 2  
ERTY SQUARE  
TON, MASS



ew York.

E, 1881.

HES.

CLEVELAND, March 21, 1880.  
please, and stands alone for  
reasons. We congratulate  
it may fancy we have been  
secured without your (ap-  
peal) HENRY BOX & SON.

Y,  
PARIS.

Price \$5 per copy.

SHES



running cool. He has made the journal boxes with a movable cellar, which can be removed like a drawer for repacking. The supply of oil to the journal bearing from its contact on the under side with the packing, gives it ample and continuous lubrication, without any risk of clogging up of small feed holes.

The Lake Shore & Michigan Southern road has made eight tests of four kinds of coal as locomotive fuel. Each test included 15 trips, two empty cars being counted as one loaded one. The results are as follows:

	Highest	Lowest
Loaded car mileage.....	65,499	52,714
Empty car mileage.....	15,013	25,985
Pounds of coal consumed.....	120,593	132,180
Pounds of water evaporated.....	767,500	777,500
Pounds of water evaporated per pound of coal.....	6.35	5.88
Miles run per ton of coal.....	32.50	29.76
Cars hauled one mile per ton of coal.....	1,312	985
Pounds of coal per car hauled one mile.....	1.85	2.03
Cost of coal, in cents, per car hauled one mile.....	0.27	0.33

The engines used were of the ordinary 8-wheel pattern built at the Rhode Island Works, with fire-boxes 66 x 35 inch, with a strip of dead grate 4 inches wide all round the box.

The Chicago & Northwestern road has adopted a standard passenger locomotive, two of which have already been built, six more are in progress, and the building of ten additional ones is contemplated. Their weight in working order is 80,000 lbs. each, 52,000 of which is on the drivers; diameter of drivers 5½ ft., cylinders 17 x 24, boiler 50 in. diameter, with 158 two-inch flues 12 ft. long; fireboxes 66 x 35. Instead of hanging the cylinders to the boiler after it is built, the smoke-arch ring is made first and taken to the erecting shop where the cylinders are hung to it, so that when the boiler comes in it can be riveted on in six hours instead of spending four or five days to hang the cylinders afterward; and it is more convenient to fit the pistons and put on the steam chests, valves and cylinder heads, with the cylinders on the floor than after they are hung to the boiler. The valves are cast at the same time in dry sand and of the same fine iron used for cylinders, thus securing a face to the valves and seats that wears longer and more evenly. Valves made of the best iron have run over 50,000 miles before refacing, which more than compensates for the extra cost.

The Chicago & Northwestern car shops, at West Chicago, are building 4 first-class coaches, 4 combination cars, one baggage car, rebuilding a superintendent's car, and are getting out the material for six more coaches. These coaches have 6-wheel trucks, the bodies are 54 ft. long and seat 58 passengers. The inside finish is cherry trimmed with mahogany, and head-linings of decorated oak. The combination cars are 50 ft. long, with 8-wheel trucks having a wheel-base of 8 ft. The mail compartment is 12 ft. x 7 ft. 7 in., the express and baggage room 19 ft. x 7 ft. 7 in., and the main room 17 ft. 6 in. long, with seats for 36 passengers. The mail room is arranged according to Harrison's patent, which is the last adopted by the Post-office department. The shops have also just finished 30 cabooses, 30 ft. long, with regular passenger trucks. The raised floor of the clear-story on one side is built up from the floor of the car, and on the other side the floor is suspended from the roof by iron rods making storage room underneath for trunks etc. The car has the usual brake and side seats or bunks with boxes underneath, and what is not so common, a lavatory in one corner and a saloon opposite. The cars are painted throughout, the exterior being a bright vermilion. They have 4 windows on a side, two at each end, and a baggage door on each side, for on many of their branch roads freight trains carry passengers and their baggage.

#### The Allen Valve.

DELAWARE, LACKAWANNA & WESTERN R. R., }  
MORRIS & ESSEX DIVISION,  
KINGSLAND, N. J., June, 1881. }

To the Editor of the National Car-BUILDER:

Your favor of 8th, requesting information as to the working of the Allen Valve, is at hand. We have now 33 engines equipped with it, 32 being of the 4-wheel connected type, and the other a Mogul. The last named engine has not been in service long enough for us to determine whether the working of the valve is a success. On the other engines, however, the valve has worked with entire satisfaction. The engines fitted with the valves are noted for being particularly smart, starting and getting under way much more quickly than with the common slide valve. We have not as yet had the valves in long enough to determine their lifetime as compared with those of the ordinary form, but from present indications we should judge that the Allen Valve would wear as long as the other. In the record which I inclose,\* I give you the mileage of the first 7 engines in which the valve was put. Engine 94, running the morning Oswego express on this division, is reported as an exceedingly smart engine. When hauling from 5 to 7 cars, she passes over the Drakesville grade, the sharpest on her run, using only 7½ inches of steam. Engines 81 and 24 have not had their valves faced off yet, and hence are showing a very good record. Of these seven engines, No. 24 has the seat cast on the cylinders, the rest having false seats.

The engines have been using cast iron valves heretofore. We are fitting up one engine with a pair of Phosphor-Bronze valves, and are watching the result with much interest.

I am yours truly,

W. H. LEWIS, M. M.

Morris & Essex Division.

\* This record shows that the first valve was put in engine 94 in March, 1880, was refaced in August, 1880, after a mileage of 19,990 miles, and a new valve put in June, 1881, the first valve having made a mileage of 33,252 miles. The other engines had valves put in them in April, May, June and July, and have since made the following mileage: No. 81, 33,434; No. 88, 30,806; No. 85, 30,222; No. 34, 34,210; and No. 87, 37,845 miles. The valves of engines 85, 88 and 87 have been refaced after making a mileage respectively of 28, 612, 23,813 and 22,875 miles, and none but the first one are yet worn out. The engines have cylinders 17 or 18 by 22 or 24 in. stroke and 5 or 5½ ft. drivers.

#### Wheel Service—Four and Six-Wheel Trucks.

To the Editor of the National Car-BUILDER:

The question is frequently asked whether it is more economical to use twelve wheels under ordinary passenger coaches than to use eight.

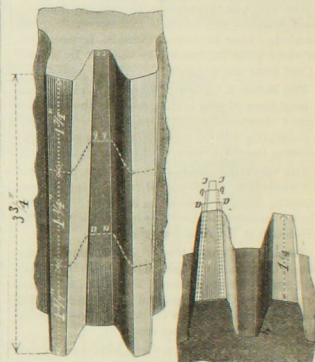
For the benefit of your numerous readers I send you the following statement, showing the comparative mileage made by twelve coaches, six of them having twelve wheels, and six of them eight wheels, the time of service covering a period of four years, namely, 1875, '76, '77, '78. The bodies of these coaches were of the same construction, and as nearly the same weight as it was possible to build them. There was no discrimination as to service. Cast iron brake-shoes, eight to each coach, were used, and all of the same pattern. The wheels were cast iron, 33 inches in diameter, and of six different makes. The following are the results as to wheel mileage:

Truck	Wheels removed	Total mileage	Least mileage	Average mileage
6-Wheel	115	12,318,818	4,012	63,175
4-Wheel	124	10,590,802	6,002	44,569

With the aid of this data, the correctness of which can be vouched for, I hope that some of your readers will be able to demonstrate in a future number of the CAR-BUILDER which of the two kinds of trucks—the six-wheel or the four-wheel—can be run at the least cost as regards the expense of wheels.

At the annual meeting of the Yard-Masters' Mutual Benefit Association in Milwaukee, June 8, the following officers were chosen: President, G. W. Evans, Denver, Col.; First Vice-President, J. H. Washburn, Concord, N. H.; Second Vice-President, J. Davis, Cleveland, O.; Recording Secretary and Treasurer, Joseph Fangra, Indianapolis, Ind.; Corresponding Secretary, C. N. Edmonds, Bloomington, Ill.

The Louisville, Cincinnati & Lexington R. R. Co. has just completed, at Louisville, a large and commodious freight house, and also a small but neat passenger depot. Some new freight engines have recently been built for the road. The tender-trucks are of the same pattern as the freight car trucks, but with a little better finish, the advantage being that in case one of the former breaks down on a freight train, a car truck can be readily put in its place. The variety of wheel and casting patterns is also somewhat diminished by this method. Three passenger cars have just been completed, and two more are nearly ready to be turned out. In their general style and workmanship they are equal to the best. The racks are hung on hooks so as to be easily removed. The inside finish is walnut, and without visible joints. A new chair-car has also just been completed, and another of the same pattern is being built, both of which display tasteful design and good construction. Both have Searle heaters. The passenger car trucks are models of strength, and are built with a special view to safety. The swing bolsters have turned case-hardened pins. Mr. August Schaeffer, the master mechanic, has devised many ingenious expedients to avoid the unnecessary handling of material. He is familiar with the European class-car system, and favors the use of lighter and cheaper cars for our passenger service. The road has 265 miles of standard, and 11 miles of 3-foot gauge.



#### IMPROVEMENT IN HAND-CAR GEARING.

The cuts illustrate an improvement in hand-car gearing by which it is claimed that the service of the parts will be very greatly increased. The smaller cut represents a portion of a gear wheel and the larger one a portion of the movable pinion, the face of which is three times as long as that of the wheel. Each is beveled just enough to draw easily in molding, except the teeth, which are tapered considerably, as shown. The axle upon which the pinion is placed must have a key-seat large enough to allow the pinion to be moved along the axle to take up the lost motion when the wheel is worn down to the dotted lines *bb*; then it will work in the second or middle section of pinion, and when worn down to *cc* it will work in the third or uppermost section, and still the teeth of the gear wheel will be as large as those in the first section of pinion were before being used. (By an error of the engraver, the letters *a b c* have been placed up side down.) The metal for the gearing should be the best of pig iron; and free from old scrap, so as to avoid hard and soft places in the teeth. The crank-shaft on gear wheel side must be lengthened about 3 inches between wheel and boxing, so as to permit the adjustment of the pinion on the axle. The expense of this is trifling, and the advantages of the improved method must be evident to all who are familiar with the working of gear wheels.

M. DOWLER,

Chicago & Eastern Ill. R. R., Danville, Ill.



### The Master Car-Builders' Association. FIFTEENTH ANNUAL CONVENTION.

The delegates to the fifteenth annual convention met on Tuesday, June 14th, at the Park Avenue Hotel, in the City of New York, and were called to order by the President, Mr. Leander Garey, of the New York Central & Hudson River Railroad.

#### ROLL OF MEMBERS.

The roll was then called, and the following members were present:

Adams, F. D., Boston & Albany.  
Baker, D. H., Pennsylvania.  
Banks, S. O., Central of Vermont.  
Beaman, S. S., Central of Vermont.  
Bissell, Thos. A., Pullman Car Co., Detroit.  
Blackall, R. C., Delaware & Hudson Canal.  
Brady, D. M., New York Central & Hudson River.  
Casper, H. L., Lake Erie & Western.  
Comber, J. P., Ohio & Mississippi.  
Davenport, W. R., Erie Car Works.  
Davis, Willis, Empire Transportation Co.  
Demarest, G. W., Northern Central.  
Donahy, R., New York Central & Hudson River.  
Farris, J. J., Housatonic.  
Fleming, J. W., Pennsylvania.  
Fletcher, J. B., National Car Co., St. Albans.  
Forey, N. M., "Railroad Gazette."  
Garey, C. E., New York Central & Hudson River.  
Glason, A., Old Colony.  
Goodrich, C. A., Lake Erie & Western.  
Gore, C. E., Lake Erie & Western.  
Griffith, S., late of Cin. Laf. & Chicago.  
Hackett, Geo., Central of New Jersey.  
Hildburg, W. T., Harrisburg Car Co.  
Hodge, John, Missouri Pacific.  
Holt, D., New York Central & Hudson River.  
Hopkins, D. A., formerly of Erie Railway.  
Kirby, John, Lake Shore & Michigan Southern.  
Kohler, M. H., Wabash, St. Louis & Pacific.  
Leighton, J. T., late of New Haven Car Co.  
Lundgren, Wm., Phila., Wilmington & Baltimore.  
McPherson, R., Flint, East & Marquette.  
McWood, Wm., Grand Trunk.  
Marden, J. W., Pittsburgh.  
Martin, W. H., Gulf, Colorado & Santa Fe.  
Mileham, J. N., New York, Lake Erie & Western.  
Miller, Robt., Michigan Central.  
Minshall, E., New York, Ontario & Western.  
Olmstead, E. A., New York Central & Hudson River.  
Ortton, John, Canada Southern.  
Packard, L., Baltimore & Ohio.  
Partridge, W. E., "Iron Age."  
Pratt, Geo. H., Indianapolis & St. Louis.  
Pratt, E. E., New York & New England.  
Raymond, J. H., Western Railroad Association.  
Richardson, D. C., Boston & Maine.  
Sanborn, A. J., Indianapolis & St. Louis.  
Smith, C. A., Union Tank Line.  
Smith, W. O., Lake Shore & Michigan Southern.  
Snyder, H. F., Pardee Car Works.  
Spivy, J., Fourth Avenue R. R., N. Y.  
Stewart, T. B., Hartford & Weatherfield.  
Stone, H. B., Chicago, Burlington & Quincy.  
Sweeney, John, New Haven & Northampton.  
Trainham, W. H., Richmond, Fred. & Potomac.  
Van Houten, I. W., Pennsylvania.  
Verheyck, B. K., Chicago, Rock Island & Pacific.  
Webster, H. A., Manhattan Elevated.  
Wilder, M., New York, Lake Erie & Western.

The following new members joined the Association by signing the constitution: Wm. H. Trainham, H. F. Snyder, J. W. Fleming, Chas. A. Goodrich, Wm. O. Smith and Edw. Minshall. The roads represented by them will be found by reference to the above list.

#### ADDRESS OF PRESIDENT GAREY.

Gentlemen of the Master Car-Builders' Association: I am permitted to greet you again assembled together, for the purpose of receiving reports from your committees and a mutual interchange of ideas; presenting for consideration any new discoveries made during the past year in reducing the cost of building and maintaining cars; and I trust each one is prepared to add something to the common fund of practical information.

Your committees having performed the duties assigned them by presenting all the information at their command, a free and full discussion of each subject will be of much benefit not only to those present but to many not able to be with us, by the use of printed copies of the reports.

A few master car-builders have been somewhat discouraged by the slow progress made in the general adoption of standards recommended by the Association; while others have claimed that more complete work ought to have been accomplished.

Admitting some cause for the complaints in each case, the good results already attained should stimulate all master car-builders to more active and thorough work in support of the Association.

Notwithstanding the imperfect organization and lukewarm support given by many master car-builders, and other influences not in harmony with the Association, the interests of the Association, the progress made is far beyond what could reasonably be expected.

I would suggest that a committee of three or more be appointed to report at this meeting what action should

be taken to make the Association more efficient in its work, with a larger interest in and attendance at our annual meetings.

It has pleased a Divine Providence to remove from among us during the past year several of our members, one of whom, Mr. Enos Varney, assisted at the organization of the Association, and has aided us by his presence and counsel at all of our yearly meetings; by his death we lose a genial friend and a useful member.

The rapid increase in number of cars employed with the large variety of patterns used in some part of their construction shows a want of harmony in the ideas of master car-builders as to what constitutes the most economical mode of construction, and leads to many evils, with no end to the annoyances of delay and expense. I will say, without fear of contradiction, that if all the freight cars in this country were of one pattern in those parts requiring frequent renewal, it would add not less than 15 per cent. to their present working capacity for transportation purposes by the time saved in making the necessary running repairs.

The present rules governing the repairs of freight cars, and settlement for the same, in cases of their destruction, are to be revised, and all roads offering cars for interchange traffic should be a party to and governed by the revised rules; and each road should have a voice in performing the rules in proportion to the number of cars controlled by it.

The old method of inspecting and repairing cars under load at interchange points is unnecessarily expensive, often causing considerable inconvenience to freight, with the attendant cost of switching and repairs under most of the possible disadvantages. The whole arrangement for moving freight by interchange over several roads without transferring loads at terminals is mutual, and should extend to all departments affected by it.

Where two men are now employed at one place to determine what repairs are necessary for cars to continue on their journey with safety, one man might decide for both parties, and thereby carry out the system, much to the advantage of all persons interested.

Joint inspection of cars at all interchange points would give dispatch to freight, largely reduce the cost of running repairs, and remove many just causes of complaint.

In connection with joint inspection could be perfected a system of noting the condition of all cars passing, and reporting those requiring general repairs, to owners. Such reports would tend to bring cars in line service up to a high grade of condition.

Coupling links and pins have been the cause of extraordinary expense and considerable discussion during the past season. The variety of sizes and lengths, with the lack of room in draw bar heads for coupling links to move without being crushed or broken in buffing (not including the poor quality of materials used in their construction), has caused many accidents, much destruction of property, and in some cases loss of life.

I was much surprised to find on examination that most of the cast iron draw bar heads are not large enough to allow the draw-bar heads to come in contact with each other without crushing the link. Coupling links and pins of a suitable size in strength, with sufficient room for their free action in draw-bars, should receive special attention during this meeting and a standard for each be established. I suggest that special irons be manufactured to be known as "rail-road coupling link and pin iron," having special qualities best adapted for the service.

According to our by-laws, the hours of daily session are from 9 o'clock A. M. until 2 o'clock P. M., and I would request each member to be present during all the hours of each session and give all possible assistance to dispatch the business satisfactorily, which can not be as well performed with a part of the members absent.

Thanking you for your kind attention, we will now enter upon the business of the convention.

Messrs. ORTTON and LEIGHTON were appointed a committee on correspondence and resolutions. STANDARD JOURNAL-BEARING, JOURNAL BOX AND PEDESTAL.

Mr. Adams, from the Committee on this subject, presented the following report:

To the Master Car-Builders' Association: Your committee, which was appointed last year, "to confer with a similar committee of the Master Mechanics' Association to consider the subject of a standard car journal-bearing, journal-box and pedestal, and report whether any change is desirable from the standard already recommended by that association," beg leave to report that after conferring with the members of the Master Mechanics' Committee it was mutually agreed to issue the following

#### CIRCULAR:

"SIR: After conferring together, these two committees have agreed to send out a joint circular to obtain information relating to the subject submitted to them.

The investigation they find that a committee of five, consisting of Messrs. C. A. Smith, I. W. Van Houten, Joseph Jones, David Holt and F. D. Adams was appointed in 1873 by the Master Car-Builders' Association, with power to produce a journal box according to their own judgment, that shall be considered the standard box."

That committee had a drawing made of a car axle journal-bearing, journal-box and pedestal. The drawing was lithographed and copies were extensively distributed. On examination of this lithograph it is found that the journal-bearing and its key are somewhat im-

perfectly shown, and if the lithograph was given to different pattern-makers it is extremely doubtful whether the patterns of these parts made from it would be alike.

The committee have also learned, from different sources, that journal-bearings and keys made from different patterns of the standard form and size are often not alike, and that in some cases the bearings of one road will not enter the boxes of another. They have, therefore, had a new and more complete drawing of the journal-bearing and key made from the lithograph referred to and from a duplicate of the original pattern from which the lithograph was made. This drawing has been made with great care, and is believed to be as nearly like what the original standard was intended to be as it is now possible to make a drawing. It has been engraved half size, and a print of the engraving is sent herewith. To enable the committees to report intelligently on this subject they request that you will give them the following information:

"1. If you use the Master Car-Builders' standard journal-bearing and key, will you please compare those you use with the engraving, and if the sizes of yours differ from the dimensions given, please erase them on the engraving, and substitute on it the sizes of the castings which you use, and return the engraving to the committee. Also state to the committee any differences in form, if any exist.

"2. Would you recommend any changes in the form or size for a journal-bearing and key, and if so, please state by the engraving, or would you prefer a journal-bearing without a key? and give your reasons for such changes as you propose.

"3. If you would recommend a journal-bearing and key of different form and dimensions from the standard, please send an accurate full-size drawing of them to the committee, or, if that is not convenient, send one of the bearings and one of the keys which you would recommend. Before you send them have them distinctly and permanently marked with the name and initials of your road.

In order to enable the committee to report to what extent the Master Car-Builders' standard has been adopted, please state whether it is used on the cars of tenders belonging to your road, and approximately the number now in use.

"As it may be necessary for the committees to send out another circular concerning the journal-box and pedestal before they make their reports, they request that you send replies to the above inquiries as early as practicable."

On conferring together the two committees have thought that it would be best to make a joint report to be submitted to each of the two associations. The following is therefore their

#### JOINT REPORT:

To the circular sent out 25 replies were received. Of these five reported that they do not use the standard journal-bearing, box and pedestal. The remaining 20 report either no differences or very slight differences in the pattern of journal-bearing which they use and the drawing sent—not enough in any case to prevent them from being interchangeable. The committee do not think, however, that this testimony should be taken as final evidence that differences which would prevent the bearings from being interchangeable do not exist. So many reports to that effect have been heard that it is thought that there must be some good ground for them, and that in those cases where master mechanics or master car-builders have found that their patterns were not right they have thought that it would be more prudent to remain silent than to report the discrepancies.

Of the 25 who answered the circular, four say they prefer a bearing without a key. All the others say either that they prefer a bearing with a key or recommend that no change be made in the existing standard.

The answers to the fourth inquiry, referring to the number of axles in use, were so few and meagre as to have no value.

After careful investigation, and from the answers received to their circular, the committees are of the opinion that no alterations in the standard should be made which would prevent new parts from interchangeable with the old, or vice versa. Some defects in the bearing, box and pedestal, however, have been pointed out to the committee which can easily be remedied without interfering with the interchangeability of these parts. The original lithograph which has been accepted as the standard, as stated in the above circular, is a very imperfect mechanical drawing. Some of the parts are imperfectly shown on it, and many of their dimensions are given in minute fractions, such as sixteenths, thirty-seconds and sixty-fourths, when the precision required made this entirely unnecessary. In other cases there were discrepancies which it was impossible to reconcile with each other. The first thing, therefore, which the committee thought should be done was to make new drawings of the bearing, box and pedestal, and make these separate from each other, so that their parts could be more clearly represented, and in making the drawings that the minute fractions referred to should be discarded except in such places where they are essential.

The attention of the committees was called to the fact that the lugs on the sides of the journal-bearing, if made of the size shown by the original drawing, are entirely too light, and that whenever they are made of the dimensions represented much loss and annoyance were entailed by their breaking off. These have therefore been enlarged, but not so as to prevent the new bearing from being used in an old box.

It has been shown, too, that the original depth of the bearing,  $1\frac{1}{2}$  in., measured from its lower surface to the top of the key, is not correct.

\* Engravings of these drawings and also of the standard axle are published with this number of the CAR-BUILDER.

#### CAR GEARING.

not in hand-car service of the parts a smaller one representing a portion which is three times the teeth, which are the axle upon which it is mounted large enough to take the axle to take in the second or third gear down to 10 in. it will action, and still the large as those in the being used. (By an axle have been placed a gear should be a old scrap, so as to the. The crank-shaft turned about 4 inches to permit the adjustment of this is a improved method after with the work-



top of the journal, was too great, and that it was difficult to put the bearing in, take it out of the box, if made as originally represented. In many cases the patterns have been reduced on this account. In the new drawing this change has been made, and the bearing is represented as 1 in. instead of  $1\frac{1}{4}$  in. deep, as it was before.

It is also said that the original key projects so far at the outer end that when the brass bearing is worn away endwise and vertically, the collar of the axle comes in contact with the key, and thus causes it to cut and the journal to heat. The outer end of the key has therefore been cut away, as shown in the drawing.

It has also been pointed out that the back of the box next the hub of the wheel, is not strong enough. This part has therefore been increased from  $\frac{3}{8}$  to  $\frac{1}{2}$  in. thick. It would, perhaps, be desirable to make it still thicker, but there is not room enough between it and the hub of the wheel.

The lugs or flanges on top of the box for holding the equalizing lever in its place have also been reduced in size, and the shape of the outside of the box has been altered and simplified somewhat, so as to give more room for packing the box.

Complaint has been made that there is not wearing surface enough between the box and the pedestal, and that consequently both of them wear very rapidly. For this reason additional flanges have been added to the box, which will come between the inner and outer plates of the pedestal and will nearly double the lateral and longitudinal wearing surface. These will not prevent the new box from being used with the old pedestal, or vice versa.

The shape of the upper part of the pedestal has been modified somewhat, and it is thought improved, so far as appearance is concerned, although the dimensions and position of the bolts have not been changed.

Much fault is found with the original journal-box cover recommended by the first committee, and some change seems desirable here. The present committee, however, do not see their way clear to recommending the use of any of the patented covers now in much favor, for the reason that no road would have the right to use them without a license from the patentee. The committee, therefore, are of the opinion that for the present, at least, the matter had better be left open for each road to use whatever its officers may think is best.

In order to bring about some definite action with reference to the subject of their report, the committee recommend the passage of the following resolution: "Resolved, That the drawings of the car journal-bearing, journal-box and pedestal, of which copies are submitted herewith, be declared to represent the standard form and proportion for these parts, and that the same be recommended by this Association for general use on cars and locomotive tenders."

F. D. ADAMS, Committee of the Master Car-Builders Association.  
JOHN KIRBY, Committee of the Master Mechanics Association.  
JAS. SEDGWICK, Committee of the Master Mechanics Association.  
JAS. BOON, Committee of the Master Mechanics Association.  
W. S. HUDSON, Committee of the Master Mechanics Association.

The resolution appended to this report was adopted as above by the Master Mechanics Association, and with the following amendment by the Master Car-Builders Association:

"Provided, That this recommendation shall be so construed as to cover the proportion and weight of the several parts involved only so far as the same may be necessary for full interchangeability; and further, that this recommendation shall not be construed to include any particular form of box cover."

Mr. FORNEY called attention to a set of castings of pedestal, journal-box, bearing and key, made from patterns according to the new drawings. A slight change had been made in the bearing so the whole of it could be worn down without bringing the collar in contact with the key. A couple of lugs were added to the box inside the pedestal to double the wearing surface, and the pedestal itself was changed a little in its outside form, but the interchangeable dimensions of the parts remained the same. The back of the box had been made a little thicker. The weights of the parts were as follows: pedestal 141 lbs., box 74 lbs., bearing 9 lbs., and key 7 lbs.

Mr. KIRBY thought that 25 lbs. might be taken off the pedestal without injuring it a particle.

Mr. ADAMS explained that the original drawings, which had proved to be defective, were made without much care and consultation, and that a good deal had been left to the discretion of the draughtsman. The pedestal and box were even now unnecessarily heavy, although lighter than they were originally. So far as interchangeability was concerned, the outline was the same; but the weight could be reduced if necessary without affecting the interchangeability of the parts.

Mr. C. E. GAREY gave the following weights of the standard parts used on his road, supposed to be those of the original patterns: pedestal 139 lbs., box 60 lbs., cover  $5\frac{1}{2}$  lbs. (malleable iron), key  $5\frac{1}{2}$  lbs., lead-lined bearing 104 lbs.

Mr. ORTTON thought the committee should have given more attention to the matter of reduction of weight, if such reduction were practicable.

Mr. HILDRUP said the important point was interchangeability; outside of that there was latitude

for individual preference. He thought the resolution reported by the committee covered all the points, and should be adopted.

Mr. FORNEY, on behalf of the committee, said that in the replies received to the circular issued, the desire was so unanimous that no change should be made in the standard that would prevent the interchangeability of the parts, that the committee did not feel warranted in making such change. If the drawings should be adopted as representing the standard, individual car-builders could modify their patterns so as to diminish the weight, but still leaving them interchangeable. While remedying the little defects that had been found, he thought it wise to adhere to the old standard as nearly as possible.

Mr. DAVENPORT referred to the difference in weight between many of the oil-boxes of the M. C. B. standard pattern in use, and the one presented by the committee—a difference of some 112 lbs. to a car; and in pedestals, of some 176 lbs. to a car. If the lighter weights of those in use were sufficiently strong, why should we commit ourselves to something heavier? Why not fix upon something more definite in the matter of weight, and not leave a margin for such a large difference, amounting to several dollars in the cost of a car?

Mr. FORNEY replied that it seemed to be assumed that there were no weak points about the box, when in fact there was much complaint about the back of it being too light, and its thickness had therefore been increased from  $\frac{3}{8}$  to  $\frac{1}{2}$  inch, which of course involved more weight of metal. It was also complained that there was not enough wearing surface in the flanges; to remedy this, additional lugs had been placed on the inside. Either that this the committee did not care to venture without authority from the association, although the weight might doubtless be slightly lessened by thinning other parts of the box.

Mr. C. E. GAREY said he had found that some of the boxes of the standard pattern were not strong enough to raise a car with a load in it. He thought a little weight in boxes, judiciously disposed, was a very good thing.

Mr. MARDEN had experienced much trouble on account of the breaking of box covers. He thought the association should, in the matter of the castings, fix upon the lightest weight consistent with the requisite strength, and then let those making the patterns increase the weight if they prefer to do so.

Mr. KIRBY said that box covers would be lightened just one-half if they were made of malleable iron instead of cast iron. As he had already said, he thought the pedestal and box castings, as shown, could be very much lightened with no disadvantage. He had frequently been asked, "What is the M. C. B. Standard?"—there were so many of them. If every man tinkers with the device after it is sent out, we shall have just as diversified a lot of standards as we have now.

Mr. HILDRUP moved the adoption of the resolution. It would not be creditable to the association to recommend a standard that was not adequate to the most severe railroad duty. Some roads have sharp curves and heavy grades that tax the running gear very much more than those with fewer curves and lighter grades. Individual judgment, however, would have its way more or less. The essential point was interchangeability. Whatever pertained to this should be exact, and all should endeavor to conform to the dimensions necessary to secure it for the mutual good of all. But the weight could be modified to suit conditions of service.

Mr. MARDEN thought box covers should be made a part of the standard. There was complaint not only in regard to their breaking, but in regard to their shutting tight. If each road was to use a cover to suit its fancy, there would be no interchangeability.

Mr. ADAMS moved to amend the resolution by adding to it the following proviso:

Provided, that this resolution shall be so construed as to cover the proportions and weights of the general parts involved, only so far as the same may be necessary for free interchangeability; and furthermore, that this recommendation shall not be construed to include any particular form of box cover.

Mr. ADAMS contended that anything like unanimity in regard to box covers was an impossibility. Everybody had his own preference. Mr. KIRBY used malleable iron because it reduced the weight, while he (Mr. ADAMS) used wrought, because in his experience it reduced the weight still more, and made a better cover. He should use it because he had the right to do so. It made no difference what cover was used. The box would go into the pedestal all the same. He would not object to receiving cars with cast-iron box-covers.

Mr. MARDEN did not believe in having different covers on the standard box, but wanted something that was standard all through—box, cover and all. Mr. ADAMS said that when the original box and pedestal were adopted, it was understood that each road should be left to its own judgment as to the kind of covers to be used. The D. S. Wood cover was put on the original drawings by direction of Mr. Joseph Jones, who made the drawings, and was assented to, but not adopted, by the committee. He did not like that cover; it was not good for anything, and he would not have it.

Mr. BISSELL thought too much attention was given to the front part of the box and not enough to the dust-guard and packing. He made packing of bulls' pates and wood faced with bulls' pates. He found that to be better than anything else he had used.

Mr. RAYMOND was in favor of the amendment proposed by Mr. Adams. It was very evident that neither this convention nor the master mechanics' convention, separately or together, could agree about a box-cover or dust-guard. The committee was wise in not recommending standards for either, as they had nothing to do with interchangeability. The front of the box was so shaped that two or three of the principal wearings in use could not be applied. Although the box-cover did not necessarily have anything to do with the interchangeability of the pedestal, box and journal, it was proper for the convention to agree upon the details so far as it could. He would be glad, however, to have a committee appointed to examine the dust-guard, and another to examine the box-cover, and report next year. He believed the pedestal in its present form was at least 25 pounds heavier than was necessary.

Mr. FORNEY wished to say that if the matter were referred to him, with no reference to what had already been done by the association, as to what seemed to be the best standard for a pedestal, journal-bearing and key, he would not adopt such a one as was now presented. But that was not the question. The question was as to what the Master Mechanics' and Master Car-Builders' associations would agree to adopt, and the committee had done what they thought best under the circumstances; that is, they had made few changes as being more likely to secure the approval of the two associations. As an illustration, a heavy lug was put on the pedestal for the use of such roads as used a journal-bearing spring. Had this lug been left off, the officers of such roads would have blamed the committee. He thought, therefore, their object could be reached by the adoption of the resolution, recommending these drawings as a standard; but if any more radical changes were to be made, he thought the standard was still a long way off.

Mr. RAYMOND understood the resolution submitted by the committee to have reference exclusively to the journal-bearing, box and pedestal, and that box-covers and dust-guards were not involved in it at all. He favored the adoption of the resolution and report of the committee, because the adoption of any standard will be better than what we have now. He also was in favor of the proviso of Mr. Adams, so as to leave every member free to do as he pleased in reference to the parts and proportions not recommended or specified in the drawings.

Mr. FORNEY suggested that it was not necessary to adopt a proviso or a resolution allowing members to do as they pleased. They would be apt to do that anyhow. If the resolution were passed without any cumbersome amendments, it would be much more likely to be approved by the Master Mechanics Association.

After some further discussion, the resolution, as amended, was agreed to. It was also ordered that the word "adopted" on the patterns should be changed to "approved," so as to read, "approved by the master car-builders and master mechanics." Mr. ORTTON suggested that in order to have patterns for the oil-box, pedestal, etc., that were exact duplicates, it would be desirable to have them made in one place and by one foundry. If they were made by different parties they would not be uniform. For his part, he would rather buy the patterns than to make them himself from the drawings.

After some further conversation the committee was continued for another year, with power to act in the matter of patterns and dust-guards, and to appoint a successor to Mr. S. A. Davis, who has retired from the committee.

Mr. RAYMOND proposed an amendment to the constitution of the Association, which was read and referred to a select committee, consisting of Messrs. Hildrup, C. E. Garey and Verbyck, with instructions to report on Wednesday morning.







there is a very large percentage less of flat wheels when brakes are applied to all the wheels, and would strongly recommend such an application of the brakes to freight cars.

J. W. MARDEN, Committee.  
S. A. DAVIS.

Mr. MARDEN said in reference to the report that at least fifty different patterns of brake-blocks and shoes had been presented to the committee for their consideration, but out of them all there were none that could be recommended at this time as a standard.

Mr. ADAMS wanted to know if the fact that these devices, or any of them, were patented was a valid objection to recommending them; and he would ask, further, if the committee had seen any that in their opinion would be acceptable as a standard, provided there was no patent on them. He was in favor of accepting a good thing, whether it was patented or not, and especially in cases where the patents had nearly expired and the royalties to be paid would be comparatively light. The question of patents should not stand in the way of uniformity.

Mr. MARDEN replied that the committee, in making their report, had understood that no patented device was to be recommended. Of the sixty replies received to the circulars sent out, nearly one-half used a brake-block with a long key running down and holding the shoe, and this would have been recommended had the committee been at liberty to disregard patents.

Mr. KIRBY believed in applying brakes to all the wheels of freight cars, and was satisfied that the additional saving in the wear of wheels would more than cover the cost.

The PRESIDENT called attention to the clause in the constitution of the association providing that patentees or their agents should not be permitted to advocate their claims in the annual meetings, but failed to see that it prohibited the members from discussing patented inventions at such meetings.

Mr. ADAMS was glad to hear this, because there was an impression among the members that the constitution did prohibit such discussion.

Mr. DAVENPORT thought that the primary object of the Association was to exchange views in regard to all matters pertaining to car construction and repairing, and that this necessarily involved the merits of patented appliances and a discussion of them by the members.

The PRESIDENT inquired whether, if it was desirable to apply brakes to four wheels of a car loaded with 10 tons, it would not be equally desirable to apply them to eight wheels of a car loaded with 20 tons?

Mr. HOPKINS had frequently observed that cars which with flat places on them were actually made round by the action of the brake-shoes; and furthermore, that new wheels not originally round tend to become so to a far greater extent when brakes are used upon them than when they are not used. He thought, too, that the length of the shoe had very much to do with improving the wheel by keeping it round.

Mr. McWOOD could not see that the labors of the committee were likely to be of much value unless they were permitted to recommend some kind of brake by its name and irrespective of patents. When they could do this, and when such brake is recognized as the master car-builders' standard, there would be some prospect of uniformity, but not before.

Mr. MARDEN said in reply that had the committee supposed that anything could have been recommended to the convention that was patented, a very different report would have been made. In regard to the application of brakes to all the wheels of freight cars, he said he was so applying them to all the cars of the Fitchburg road under instructions from his superior officers, who were of the opinion that a considerable saving was effected by this means, especially on heavy cars. A very small number of flat wheels were found on cars having double brakes, and the power of the brakemen to stop a train quickly was nearly doubled.

#### AMENDMENTS TO THE CONSTITUTION.

The following substitute for the present sections 1, 2 and 3, of Article III. of the constitution, had been proposed by Mr. Kirby and referred to a committee:

"SEC. I. There shall be three classes of members, Active, Representative and Associate members.

"SEC. II. Any person holding the position of Superintendent of the Car Department, Master Car-Building or foreman of a railroad car-shop, or one representative from each car manufacturing company may become an Active Member by signing the constitution, or authorizing the President or Secretary to sign for him, and paying his dues for one year.

"SEC. III. Any person having a practical know-

ledge of car construction may become a Representative Member by receiving a written appointment from the President, General Manager or General Superintendent of any railroad company to represent its interests in the Association. Such member shall have all the privileges of active members, and in addition thereto, on all measures pertaining to the adoption of standards for car construction, or the expenditure of money, he shall have one more vote for each thousand cars owned by the railroad company which he represents. In the enumeration of four, six or twelve-wheeled cars, four axles to count as one car. The dues of Representative Members shall be in proportion to the whole number of votes they are entitled to cast. Their membership shall cease if their appointment expires or is revoked by any officer authorized to make it, or when such a member leaves the employ of the company by which he was appointed."

Mr. HILDRUP, from the committee, reported in favor of the adoption of the proposed substitute, and also of the following resolution in addition:

Resolved, That all reports of committees to be made and considered at the next annual meeting shall be sent to the Secretary at least twenty days prior to the first day of the next annual convention, and that said reports shall be by him printed and distributed among the members on the first day of the next convention.

Mr. BISSELL opposed the amendment. He thought its effect would be to place the control of the Association in the hands of a few men, and to give the Association the power to control the New York Central and Pennsylvania could manage the whole thing. The object of the Association was to develop the best methods of car-construction, and it was possible that in many cases the men at the head of the car departments of small roads or of small car companies had as much ability as those employed by large companies or corporations. The amendment would tend to diminish the interest in the annual meetings of the Association and impair its usefulness.

Mr. COULTER concurred in the views of Mr. Biswell. The road he represented—the Ohio & Mississippi—was a small one and had but few cars, but it was just as much interested in the action of the Association as if it owned ten times the number, and was just as much entitled to a voice in the adoption of rules and recommendations that might be proposed.

Mr. HILDRUP said that the object of members in coming to these meetings was to bring about greater perfection and uniformity in car construction; and in respect to this he would ask the great leading lines were not as much interested as the smaller lines. The spirit of competition, if nothing else, was an inducement for them to make every possible improvement in their car equipment to facilitate and cheapen the transportation of freight. They had the largest interests at stake, as well as the best opportunities of knowing what was best and most practical in railroad machinery and appliances. Suppose they should undertake to control this Association in its action or in its discussion. The judgment of each and every member was necessarily as free and untrammelled as ever, and they were left as free to adopt or reject proposed improvements as they are now. It should be borne in mind that these great lines have the power to introduce improvements that the smaller lines have not, and that it would be a great advantage to bring them in here and secure their approval and co-operation in carrying out whatever might be agreed upon as the best. We need to be brought into closer relations with those who control the machinery we had to work, as the only means of making substantial progress. The progress already made had been slow—witness the standard axle, for example—but it would be more rapid with the aid which it was the object of the amendment to secure.

Mr. RAYMOND said that during the past five or ten years—ever since standards had been talked about—not a single member of the Association had been satisfied with the results produced. If members did not know more about the details of the departments of which they were in charge than any body else, then they were not in the right place. If they did know more about such details than anybody else, their judgment in the matter should have more weight than it now has. The important question was, and had been all along, how to enforce what the individual and collective judgment of members approved. The *how* was pointedly illustrated in the way in which the rules pertaining to the interchange of freight cars were framed, revised and adhered to from year to year. The management of the roads was represented in the matter; and when the same principle was applied to the Association as a whole, it would then have behind it the power of the companies to give effect to what it does. It would then be, in fact as well as in theory, a representative association, and this, as he understood it, was the ultimate ob-

ject of this movement. The idea that the two great trunk lines that had been named were going to control the machine was a delusion; and even if it were not a delusion he did not care. Where was the harm, or what was there to fear? Suppose Mr. Vanderbilt or Mr. Roberts should issue an order that a certain brake-shoe or something else should be adopted on their roads. How many members were there in this Association that would not be indirectly influenced by such an order? If these large controlling interests can be represented in the Association in such a way as to be bound by its acts and decrees, it has got what it has been trying ten years to get. Nor is it a fact that the votes of these lines, on the basis of the number of freight cars, would be a majority in the Association. The attendance would be three times what it now is, and any bad, corrupt or overreaching measures that might be proposed would be easily voted down.

Mr. MARDEN did not fear any evil results from the adoption of the amendment, but still he could not see what was to be gained by it. If the New York Central road, for example, could send one man here who knew what they wanted as well as any other man did, and could vote for what was wanted, he could not see what was gained by having more than one representative. If the one sent was incompetent and didn't understand his business, it might be proper in such case to send another to help him out. The only gain that was likely to result from the adoption of the proposed amendment, so far as the roads were concerned, was not in sending men here who were more competent car-builders, but who were better talkers, and could tell what they knew. Even if something is adopted by the vote of the large roads, which the small roads, owning from 500 to 1,000 cars, do not approve, it could not be forced upon the small roads, nor could they be compelled to adopt it. It was very true that as things now are our votes here were good for nothing unless backed up by the road managers; but if the roads have any confidence in us as the managers of the car department, they will be apt to adopt what the Association recommends, especially if an increase of earnings is likely to be the result. The adoption of the amendment, as it seemed to him, would be equivalent to saying that we were not competent to transact the business of this convention. Mr. BISSELL wanted to know if a road that was represented by several car-builders in the convention had more votes than a road that was represented by only one car-builder. The proposed change in the constitution would allow one vote for every thousand freight cars, it depends on the cars, with no discrimination between four and eight wheeled ones. Brains ought to be represented here and not cars. We do not come here as if this was a meeting of stockholders.

Mr. RAYMOND said the point of the whole business was for members to come here with credentials—with a letter of appointment authorizing each to vote and act for a road company. Some of the members present, it is very well known, come here at their own expense and of their own motion. This was not right.

Mr. MARDEN thought that if any body was to be delegated it should be the master car-builders, who know more about their own special work than any one else.

Mr. ADAMS supported the amendment because its effect would be to bring the Association into more direct contact with the power behind it, and which was needed to render it a practical working institution—an instrument of the railroad companies themselves. He had no objection to having the voting power of members limited by the number of cars. If the New York Central or Pennsylvania road had 20,000 cars, they would each have twenty times as much interest in what was done here as a road having only 1,000 cars, and he was willing that the majority should rule. He was in favor of admitting road managers, presidents and superintendents to membership. The amendment made a place for them, and when it was adopted, they would either come themselves or send delegates to act for them. The Pennsylvania road had not been represented in the Association for four years. They do not recognize us nor our doings, but they were influenced by our acts—there was no question about that. They had not adopted the standard axle, but had come as near to it as they could without adopting it; and the same might be said of other roads and of other appliances. He had no idea that in case the amendment was adopted, the Association would be ruled or made subservient to the interests of any one road, no matter how many cars it might have. There were rival roads and competition enough to prevent that.



Mr. C. E. GAREY said that the shape in which this matter was now presented was very different from what it was at the last year's convention. The proposition of last year changed the whole character of the Association; but this year it was only proposed to give certain roads having large interests a proportionate voice in our deliberations. The Association in other respects remained precisely as it was now. He did not accept the idea advanced by some, that it had done nothing to speak of, and could do nothing. As deficient as the Association was in authority it nevertheless exercised an influence that was felt all over the land.

Mr. HOPKINS said that the proposition was a very innocent-looking thing on its face, but it was at the same time very far-reaching—how far, no one could tell. He thought that a matter of such vital importance to the well-being and very existence of the Association should not be disposed of without at least a year's notice, so as to give members an opportunity to examine into the matter and vote intelligently upon it. In regard to the adoption of standards, he thought the progress in that direction was quite fast enough. The railway system had not yet reached maturity, and standards should not be adopted Chinese-shoe-fashion, so fast as to shut off improvements. It was practically impossible for any man to devise standards that would be worthy of being retained twenty years hence.

Mr. ORTTON moved that the whole subject be postponed until the next annual meeting. The President said he had looked into the subject matter of the proposed amendment very thoroughly, and after listening to all that had been said about it, he was fully convinced that it should be adopted now, and that members would be no better prepared to vote intelligently upon it a year hence than they were to-day. He hoped it would be adopted unanimously.

After some further discussion, the matter was referred to a select committee of five, with instructions to report to the next annual meeting. A resolution was adopted requiring committees to present reports for the next annual meeting to the Secretary twenty days before such meeting, and that they be printed for the use of the members on the first day of the session.

## BRAKE-SHOES.

Mr. ADAMS offered the following resolution:

Resolved, That it is the sense and belief of this Association that it is for the interest of all railroad companies, as a matter of economy, to adopt what is known as the "Frederick" brake-shoe, and that brakes should be applied to all the wheels of a car; also that a committee be appointed to make a drawing of such brake, showing its connection and application, thereby securing absolute uniformity.

Mr. ADAMS was of the opinion that the patent on the shoe had not a great while to run, and that the cost of royalties for the unexpired time would not be very great.

Mr. DAVENPORT was opposed to recommending any patented device unless it was distinctly understood what it was to cost, including royalties. This was in accordance with what is required in all regular business transactions. He wanted the bottom figures.

Mr. ADAMS said that it was not the price asked for a patent that was generally paid. His road once had occasion to buy a certain patent for which \$3,000 was asked, but after several interviews with the parties, it was obtained for \$800.

Mr. BISSALL said the question was not so much whether the railroad companies should pay more or less for a patented article, but whether they should pay anything. He was afraid the \$800 paid by Mr. Adams was too little. The patented brakes were pretty nice fellows, and he didn't want the association to be too hard on them.

Mr. ADAMS agreed that they were nice fellows, but when had a million of cars to be equipped with a device, if the inventor got a dollar a car royalty for what was not worth more than twenty-five cents, he had no reason to complain about the compensation. He could not agree with Mr. Bissall that railroad companies were not willing to pay. They were willing, but did not want to be led.

Mr. BISSALL had drawn his inference from the remark of a manager of one of the largest railroads in the country, that he would rather spend money in fighting a patent than in paying for it.

Mr. VEDRYCK wanted to know something about the shoe before passing the resolution. Mr. ADAMS said forty roads were using it, and they ought to know pretty well what it was. Mr. DAVENPORT.—Not if they are all different. Mr. ADAMS.—What little variation there may be

the parties have made themselves in making their patterns.

Mr. DAVENPORT.—What is the royalty?

Mr. ADAMS.—That depends on the size of the road. When his road paid the \$800 it did not have so many cars as it has now. If other shoes are found to be preferable, he would urge the road to make a change; but he knew of none superior to this one, and he had seen as many kinds of brake-shoes as the next man.

Mr. MARDEN moved that the matter be referred to a committee who shall have drawings made of the different kinds of brake-shoes that may be considered the best, and that the whole subject, including cost of royalties, be reported to the next convention; which motion was agreed to.

## FREIGHT TRAIN BRAKES.

Mr. C. E. GAREY, from the committee on this subject, presented the following report:

To the Master Car-Builders' Association:

GENTLEMEN: Your Committee on Freight-Train Brakes was increased at the last annual meeting of the Association from three to five members, and submit the following report:

1. In order to get all the information possible upon this subject, a large number of circulars were forwarded to the railway superintendents and master car-builders in different States. The Circulars were answered by also many others presumed to be interested in the safe and rapid transportation of freight, asking for information upon specified subjects. Some of the answers were so familiar as to not require repetition here, and should this report fall to meet the expectation of members, they may consider if they have contributed assistance in preparing it as requested through said circulars.

2. Dr. Smith's patent brake has been reported as doing good work on the Buffalo & Lake Huron Division of the Grand Trunk Railway. This brake is applied to the front or rear of train of 10 or 12 cars by one man. The cars require a special connection between them to operate the brakes. It has been in operation some 15 months, requiring little or no repairs. The first cost is from seven to eight dollars per car.

3. The American Brake Co. has a number of cars equipped with its freight-train brake on the St. Louis & San Francisco Railway. A very satisfactory trial was witnessed by one of the members of your committee last winter, but as printed circulars of this trial have been quite extensively circulated, it is unnecessary to report here. Your committee apprehend some difficulty in the practical working of this device, not only in regard to its construction, but also in the fact that there is no arrangement for utilizing the car-brakes until a speed of 6 or 7 miles per hour has been attained, but, as we understand several hundred cars are to be equipped with it on that road, practical efficiency is in a fair way of being thoroughly tested. The weight of this brake is about 250 lbs. for double brakes, springs, 4 lbs.; cast-iron, 20 lbs.; wrought-iron, 20 lbs.; and wrought-iron, 160 lbs. Cost, about twenty dollars.

4. A new device known as the "Reed" brake has been in operation for nearly a year. The inventor has given it careful attention on the trains, modifying and remodeling, until well satisfied with its performance. It requires no attention from train-men, setting itself at a speed of 3 to 4 miles per hour, and releasing at 2 to 3 miles. The weight of this brake is about 500 lbs. (consisting of steel springs, \$7 lb.; wrought-iron, including bolts, chains, etc., 180 lbs., and cast-iron, 205 lbs.). It is applied to one end of the car only, but operates the brake in either direction. Probable cost about \$8.

This brake is open to the same objection as the preceding one, although in a less degree, as it is set at a slower rate of speed.

5. The "Tallman" brake has also been running since last summer, and has been much improved to overcome difficulties as they have presented themselves in practical operation during the past year. This brake has the advantage of stopping the train at all rates of speed, and holding it until the engineer is ready to move, and can be readily set by brakemen when making up the train, by a one-quarter turn of short handle at either end of car. The weight of this brake is about 450 lbs., consisting of steel springs, 7 lbs.; cast-iron, 385 lbs.; and wrought-iron shafts, bolts, etc., 60 lbs. This weight being equal on each truck. Probable cost, about \$25.

At a trial of this brake some time since, good stops were easily made, and your committee think it is worthy of a more extensive trial, having been in use on only five cars.

Both of these brakes are simply additions to the hand-brake system now in use, operating all the brakes whether on one or both trucks, and are independent in their action on any car to which they are applied, without any other connection than the ordinary coupling between the cars. They can be seen at the New York & Harlem freight depot, Forty-seventh street and Fourth avenue, New York city, by any member of the Association desiring to inspect them.

6. At the last annual meeting, your committee reported 22 freight-train brakes; since that time 14 more have been brought to our notice, making 36 in all. Of these, over one-third are designed to work in connection with a special connection between the cars, but, in regard to the practical operation of these new devices, with a single exception, we are not advised. Yet the efficiency of these brakes, as practically demonstrated on a small scale during the year would seem to warrant your Committee in the be-

lief that railroad companies can afford to encourage inventors, by using enough of those which act independently on any car to fully develop their capabilities and secure to themselves the advantages of a more rapid movement of freight trains, and as long as they will all work together in the same train, independently of each other, each corporation can select the one that commends itself to their judgment and still have it work harmoniously with those of connecting lines.

In conclusion, your committee would recommend the fitting up of 50 cars, at least, with each independent brake (although none of them have reached the highest point of perfection), which has been thoroughly tested and proved successful on a small scale, and running them in trains with 25, 50 and 75 per cent. of cars not so equipped, at from 15 to 30 miles per hour, in long trains, to demonstrate the per centage of automatic brakes required, with the rate of speed at which the engineer would have complete control of his train, and, at the same time, determine the action of the brakes in running over grades, through cuts, etc.

C. E. GAREY,

Geo. HACKETT,

J. P. COLTIER,

Committee.

SCREW-THREADS, BOLTS AND NUTS.

Mr. ORTTON, from the committee on this subject, presented the following report:

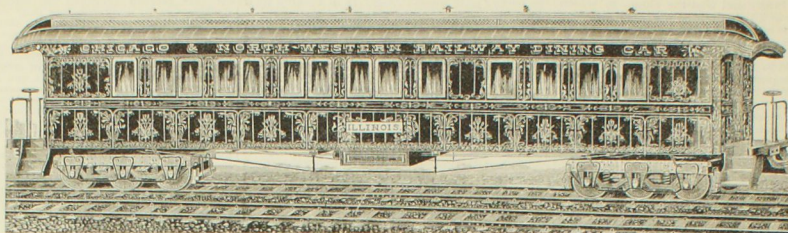
To the Master Car-Builders' Association:

Your Committee regret that they can do little more than repeat what they reported to you last year. At that time a member of your Committee made the following verbal statement:

"At the last meeting, you remember that our Committee was instructed to prepare a circular urging the adoption of the Franklin Institute standard for screw threads. After that resolution was passed the Committee examined into the matter and discovered that many of our members were in the manner of manufacturing taps and dies. It is an illustration of the extreme difficulty of introducing a standard of any kind whatsoever, unless there is some authority to enforce the form of specifications or gauges—some ultimate standard reference. You all know that the Franklin Institute standard was proposed by Mr. William Sellers of Philadelphia, and was first adopted by the Franklin Institute. The standard specifies certain things, among them the diameter of the screw and the angle of the thread. When manufacturers commenced making these taps and dies, some sets of gauges were made by a man named Fox, and some by others. These gauges were distributed all around, and the Morse Twist Drill Company produced a set of them, and worked according to them. The Pratt & Whitney Company of Hartford, when they commenced making taps and dies, undertook to work as nearly as possible to a true size, and for that purpose procured a set of Whitworth gauges from England. When the Erie Railway undertook to introduce standard screw threads, they found that when they took a nut from one manufacturer and attempted to screw it on a bolt of another manufacturer, it would not go on. This led to the discovery that there were differences in the taps and dies of the different manufacturers in the country. This coming to the attention of the President of the Association, it was decided to ask Mr. William Sellers to come to the rooms of the Association and confer with regard to the matter. Mr. Sellers did that, and I think was surprised to find that there were discrepancies existed. The next thing was to induce the manufacturers to come together and try to reconcile their differences, and at this time the Morse Twist Drill Company and the Pratt & Whitney Company are engaged in a most thorough investigation of the subject. The Committee did not feel justified in preparing such a circular as they were instructed to so long as these discrepancies existed among the manufacturers of taps and dies. But in a very short time those discrepancies will be reconciled, and we shall have a standard by which we can be guided, and I would suggest that the Committee be continued another year."

Since then the same member of your Committee who made the above statement has visited the Pratt & Whitney works at Hartford, and there learned that the whole work of constructing standard gauges has been assigned to that company, and that for the past year, or longer, they have diligently been at work on the machinery and instruments for making them. To show the difficulties which must be met when exact precision is aimed at, it may be of interest to state that their first step was to procure one or more standard yards, that is, metal bars exactly a yard long. These they procured, as nearly of the correct length as it was possible to obtain, they were taken or sent to those persons who it was thought had the most exact means of measuring them, when it was found that the measurements of no two of these persons of the same bar nor no two of the bars was exactly the same. It then became necessary to have a standard yard verified in London, next to make a machine to measure and subdivide it. Persons not acquainted with the difficulty of attaining any high degree of precision in measurements have no idea of the amount of labor involved in doing it. Let it be sufficient to say here that the Pratt & Whitney Company have employed a number of the most expert persons they could obtain to do this work, who have been constantly employed on it at a very heavy expenditure of money. The work is not yet completed. Besides a machine for making linear measurements, instruments had to be constructed for measuring the angle of the threads and their pitch. It is advanced this far there would be little trouble in making correct cylindrical gauges, but they found that in order to get at the size of a screw with the greatest accuracy it is necessary to measure it over the sides of the threads. There is no difficulty in making a correct steel screw gauge which is not hardened, but which is not yet soon worn and then would no longer be correct. It therefore became necessary to devise a process by which they could be hardened, and the Pratt & Whitney Company expect to be able to supply screw





IMPERIAL PALACE DINING CAR-CHICAGO &amp; NORTHWESTERN RAILWAY.

and other gauges within six months which will be nearer absolutely correct sizes than any which have ever been made. In fact this company expect when their instruments and machines are completed to attain a higher degree of precision in measurements than has ever been reached before, and it is confidently expected that their measuring machines (they are making two, one to go to Cambridge) will be the most exact instruments of the kind in the world. The work which they are doing will, in fact, be a great step in advance in the science of exact measurement, and will, when it is completed, make a very much higher degree of precision in mechanical construction possible than has been attainable heretofore. To the Pratt & Whitney Company great credit will be due for undertaking this work and carrying it through in so thorough a manner and at so great an expense. This Association will also have the satisfaction of knowing that through its efforts the manufacturers of tools of precision were led to undertake this work, as it was the car-builders who originally called the attention of the manufacturers of taps and dies to the discrepancies in the sizes of such tools made at the different establishments.

The facts as related lead your Committee to ask to be continued for another year, as they feel confident that before the end of that time they will be able to perform the duty you have assigned to them more satisfactorily than heretofore, and that the gauges of the Pratt & Whitney Company will make it possible to establish a standard "of the amount of accuracy desirable in screws and nuts" with a degree of precision which has thus far not been practicable.

JOHN ORTON, Committee.  
M. N. FORNEY, Committee.

THE Southern Car Works Company, of Knoxville, Tenn., was chartered on June 3. The capital stock is \$100,000. The company expects to get the works in operation in less than sixty days, and will employ 200 mechanics at the start.

THE Pullman Car Co. are building at their Chicago shops a special car for the *Railway Age*; also 5 sleepers and 17 passenger cars for the Union Pacific; 22 passenger cars for Chicago & Northwestern; 20 for New York, Lake Erie & Western; 4 for St. Paul, Minn. & Manitoba; 10 for Chicago & Eastern Ill.; 20 for Toledo, Delphos & Burlington; and 6 combination baggage, mail and express cars. The company is also building at their Detroit shops 3 parlor cars for the Cincinnati Southern; officers' cars for N. Y., L. E. & W.; Northern Pacific; Galveston, Harrisburg & San Antonio; Ohio Central; St. Louis & San Francisco; and N. York & N. England. Also 2 sleepers for Utah Northern; 4 for Denver & Rio Grande; 2 for Chicago & Rock Island; 2 for Northern Pacific; 4 for Atchison, Topeka & Santa Fe; 4 for Wabash, St. Louis & Pacific; 2 each for Chicago & Alton, N. York & N. England, and Ohio & Miss.; 3 for C., B. & Q.; 6 for Pullman Southern Car Co.; 4 for Vandalia Line; 6 for Union Pacific; and 12 for various other roads. Also 2 passenger cars for Detroit, G. Haven & Milwaukee; 2 for Utah Central; 8 for International & Great Northern; 4 for Morgan's Louisiana & Texas; 12 for A. T. & Santa Fe; 3 for Texas & Pacific; and 3 for N. Orleans Pacific; also 1 pay and 3 combination cars for other roads, and two trains of 4 cars each ordered by Hon. John Evans for the New Orleans & Denver—making a total of 99 cars at Chicago and 114 at Detroit shops.

The engraving represents one of the four "Imperial Palace Dining Cars" just completed at the West Chicago shops of the Chicago & Northwestern Railway, and named respectively "Illinois," "Brunswick," "Leland," and "Delmonico." They are to take the place of the hotel cars that have been running some three years with the through trains of the road between Chicago and Council Bluffs. Each car is 69 ft. in length over all, the bodies being 62½ ft. long by 10 ft. wide. They have 6-wheel trucks, 33-inch Allen paper wheels, and well adjusted springs for easy riding. The main or dining saloon is 32 ft. in length, and is divided into five sections on a side, with a table and seats for four persons in each. Large plate glass mirrors cover the end partitions, and also the wide window panels, the effect of which is to make the size of the room seem much larger than it is. At the end of each double seat is a large window, the panels over the seat backs are narrow and those over the tables wide, with three alcoves for tumblers, salt, spices, etc. The seats are covered with maroon leather, and the floor laid with 3-inch alternate strips of walnut and maple. The seat ends and frames and the inside finish are cherry trimmed with mahogany; five Adams & Westlake 2-light chandeliers with argand burners hang over the aisle—one to each pair of tables. These, and all the metal trimmings of the car are gilt. The head-linings are decorated oak, paneled with mahogany moldings. Those below the clear-story have paintings of game, fruit and flowers. Hartshorn roller shades are used instead of blinds, and roll up out of sight under box-moldings. The windows are all double, the outside ones of the kitchen having game and fish designs ground in the center. The kitchen is 13 x 8 ft., and built of solid walnut, with all requisite utensils and conveniences. Water is carried in a long cylindrical reservoir in the clear-story overhead. Between the kitchen and dining saloon is a pantry 4½ x 8 ft. In the end corner of the car is an ice closet with glass bottomed drawers opening into the kitchen, also a closet for small stores. At the opposite end is a Baker heater, linen and wine closets, lavatory and ice chest. Without particularizing further, it may be said that these cars are believed to embody all the improvements pertaining to their class, and are unsurpassed in their luxurious accommodations and handsome finish by any others in the country. The outside is painted a dark wine color relieved with gilt tracery and ornamental designs representing storks, passion-flowers, cornucopias, etc.

SAFFORD's draw-bar has been very strongly indorsed by the railroad commissioners of Massachusetts. Mr. Safford has issued a pamphlet containing some twenty-five pages of letters from prominent railway men, commending his draw-bar.

#### Mortality of Brakemen.

The brakemen on our railroads find it quite difficult to get their lives insured. It is estimated that there are at least ten brakemen killed throughout the country every day. The reader of the daily newspaper learns how this class of men are killed or maimed while coupling cars and making up trains, while others are knocked from the tops of cars by bridges, or slip or fall, or are injured or killed in collisions. Then there must be at least three times as many brakemen injured as are killed of whom the public knows nothing about or gets no account.

At the lowest calculation, if ten brakemen are killed every day, that would be equivalent to 3,650 during the year, which, added to the number injured in various ways while on duty, would give the sum total of deaths and injuries about 14,000 a year. These are frightful figures of a fatality, a loss of life or injury to the body, that is attributable either to accidents, carelessness or negligence.

We therefore venture to assert that it is a fact that the public has no idea of the number of accidents that occur on the various railroads throughout the country every day; and it is also true that there is no vocation so fraught with danger to life and limb as that of the brakemen on our railroads, particularly on freight trains, men on passenger trains having a great many lives intrusted to their care, and consequently, have a greater responsibility resting upon them than that which rests with the freight men.

Indeed, the life of a freight brakeman is a precarious one. Some insurance agents, in some parts of the country, do not take risks on employees on freight trains; but conductors and brakemen on passenger trains are insured by their paying an extra per cent. Railroad men say that only about 25 per cent. of the brakemen of freight trains die a natural death; also, that the average life of the brakeman, after he goes on the road, is about ten years.—*Boston Commercial Bulletin*.

The new Acme Elliptic Spring, made of hammered steel, combines lightness with strength, and brings the cost of this class of springs for freight cars within reach of every road.

THE Central Railroad of New Jersey has just received four new passenger engines from the Baldwin Locomotive Works for its heavy summer passenger traffic. Two of them have 18 by 24 in. cylinders, and the other two 19 by 24 in.; in other respects the engines are alike. The driving wheels are 5 ft. 8 in. diameter and spread 7 ft. 6 in. apart. The boilers are 52 in. diameter next to the smoke-box. The fire-box is 10 ft. 6 in. long by 3 ft. 7½ in. wide, and is placed on top of the frames. The boilers have 200 tubes 2 in. in diameter and 11 ft. 4½ in. long. The tank holds 3,500 gallons of water.



Fig. 1.

Scale 2" to 1'.

Fig. 2.

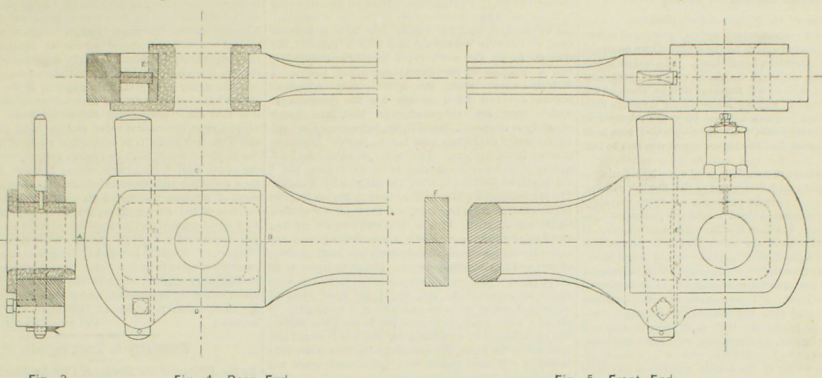


Fig. 3.

Fig. 4. Rear End.

Fig. 5. Front End.

## PARALLEL ROD FOR LOCOMOTIVES—LAKE SHORE &amp; MICHIGAN SOUTHERN RAILWAY.

The engraving illustrates the standard parallel rod for locomotives of the Lake Shore & Michigan Southern Railroad, and is copied from the working drawings in the shops of the company, at Elkhart, Ind. The rod is made of steel, with solid ends, the ends having openings to take brasses, liners and keys, similar to those used with straps.

Figs. 4 and 5 are elevations respectively of the rear and front ends. Fig. 1 is a section of the same through C D; Fig. 2 is a top plan of the front end (Fig. 5); E in the several cuts is the liner; F between Figs. 4 and 5 is a section of the middle of the rod.

The principal feature of this rod is in the construction of the brasses, which have no top or bottom flanges on the inside, as is shown in Fig. 3. In order to permit their being put in or taken out of the solid end. When the keys are removed, the openings in the rods are long enough to permit the back halves of the brasses to be taken out past the collar of the crank-pin, and then, after sliding the rod forward, the other halves of the brasses can be taken out. It will be noticed in Fig. 1 that the back halves are held in place by the liners E, which in turn are held by the keys fitting into the recesses made for them.

The whole arrangement is stronger, and there is not the risk of breaking bolts or losing nuts incident to the stub ends with straps, while retaining all their advantages for taking up lost motion. In fact, it seems to combine all the advantages of both strap and solid ends, and is much more economical in repairs than either. The rod is 4 x 1 1/2 in. at the neck, but wider and thinner (4 1/2 x 1 1/2) at the center, which gives greater resistance against vibrations at the center when running fast.

## The Master Mechanics' Association.

The annual meeting was held this year at Providence, R. I. About the usual number of members were in attendance.

The proceedings were opened by the President of the Association, Mr. J. M. Lauder, of the Northern R. R., who delivered his annual address, in which he alluded to the instrumentality of this and kindred associations in promoting railroad prosperity and cheap transportation. We make room for the following extracts:

Steel rails have enabled us to use large locomotives and heavier and stronger cars, so that car-loads have been doubled in weight and the cost of operating largely reduced, especially in the freight traffic department. Steel tires have also done their part in promoting economy and safety in railway management. It has been practically demonstrated that steel tires properly secured to the wheels of a locomotive are almost absolutely safe; and the few breakages that do occur can generally be traced to faulty workmanship and almost exclusively to excessive shrinkage. The question of the superiority of steel to iron for the tires of driving-wheels for locomotives we may consider as settled, and yet in the infancy of our Association it will be remem-

bered that committees were appointed who gave the matter the fullest investigation in its then undetermined state, and the discussions elicited may be turned to with an interest, greatly enhanced by the marked advance of the past few years. The displacement of iron and copper for locomotive boilers, and the introduction of steel, was only effected after the most painstaking investigation and repeated experiment, and manufacturers, awakened by the agitation to its importance, have aided by scientific research until they have succeeded in producing a steel that is universally admitted to be far preferable to any other material for this purpose. As a consequence locomotive boiler explosions are now almost entirely unknown, whereas formerly they were of comparatively frequent occurrence.

Another outgrowth of our inquiries and examinations has been the steady increase of the locomotive engine in size and capacity. At the time of our organization, only thirteen years since, the recognized standard engine had cylinders 16 in. x 24 in., four coupled driving wheels, with a weight of thirty tons, and from this standard has been enlarged until we now have cylinders of 20 in. x 26 in., eight coupled driving wheels, with a weight of fifty tons; and these magnificent machines are now in use in all parts of the country where there are heavy grades to overcome for a large traffic. The rapid and constant improvement in this respect has been so marked that we may confidently expect still further progress in the future, and it will be our mission, as in the past, to assist this development by continued research, and thus add to the welfare of our immense and unparalleled railway system.

The report of the Secretary shows that 17 new members have joined the Association since the last meeting, making the whole number of members 197. The "Boston Fund" has been increased by interest and donations to \$4,069.51; and the balance in the hands of the treasurer is \$730.81.

A lengthy report was presented on the subject of Roller Construction, by Mr. Reuben Wells, of the Louisville and Nashville road. A paper was also read by Mr. F. M. Wilder, of Susquehanna, Pa., upon train resistance. Mr. J. M. Boon, of Fort Wayne, Ind., made a report on the better combustion of bituminous coal as fuel for locomotives.

Mr. Woodcock, of the Cent. R. R. of N. J., made a report on the best form of construction of locomotives for fast passenger service, the committee basing its inquiry on a speed of 50 miles an hour, and whether the American or 8-wheel engine or an engine having a single pair of drivers and a 4-wheel truck were the best for such speed, and arriving at the conclusion that for express passenger service, under all circumstances, the American or 8-wheeled engine is the best for American railroads, the dimensions to be worked out under service, grades and conditions.

Mr. Forney, from the committee on a standard car journal-box, bearing and pedestal, appointed to confer with a similar committee of the Car-Builders' Association, made a report recommending the adoption of the following resolution:

"Resolved, That the drawings of the car journal-bearing, journal-box and pedestal, of which copies are submitted herewith, be declared to represent the standard form and proportion for these parts, and that the

same be recommended by this Association for general use on cars and locomotive tenders,"—which was agreed to, and is the same as the one adopted by the Car-Builders' Association on the previous day.

The convention adjourned to meet at Niagara Falls on the third Tuesday in June, 1882. The following officers were elected for the ensuing year: President, J. N. Lauder; Vice-Presidents, Reuben Wells, James Sedgely; Treasurer, S. J. Hayes; Secretary, J. H. Setchel.

The Toledo, Delphos & Burlington Company has contracted with the United States Rolling Stock Company for a large number of flat and coal cars for use on the roads.

WILSON, WALKER & Co. have erected a one-ton steam hammer for hammering car axles, and are building new offices on Twenty-ninth street, Pittsburgh, which are very finely finished.

The Pennsylvania Railroad shops at Altoona, Pa., have lately built several open observation cars, one of which will be attached to each passenger train passing over the Alleghenies.

An improved step for passenger coaches has been patented by Mr. Sylvester J. Tucker of Richmond, Va. This invention relates to an improved additional adjustable step to lessen the distance between the ground and the front step of railway passenger coaches, it being designed principally for the convenience of women, children, and aged and infirm persons, who experience great inconvenience and even danger in mounting the higher steps now in use.

BLACKMER & POST, St. Louis, Mo., manufacturers of sewer and culvert pipe, have recently received orders for two car loads of their double strength culvert pipe, from the Buffalo, New York & Philadelphia Railroad.

HARTSHORN'S SELF-ACTING SHADE ROLLERS received the first prize award at the recent International Exhibition at Melbourne, Australia. It is convenient and durable for car windows. They are sure to become popular wherever they are used.

The Industrial Works, of Bay City, Mich., have shipped steam shovels and derrick cars to the Providence & Worcester and Michigan Central roads, and are now building on tracks connected with their works shovels for the Minneapolis & St. Louis; New York & New England; St. Paul, Minneapolis & Manitoba; and Memphis & Charleston railroads.



### Communications.

#### American and English Locomotives.

To the Editor of the National Car-Builder:

I notice in a contemporary railway journal of recent date, a contributed article on the comparative merits of English and American locomotives. The writer is certainly candid, although he shows a lack of judgment in respect to the eternal fitness of things, when he admits that English engines make faster average time than American engines because they are required to haul much lighter loads, while the *Engineer* labors hard to make it appear that the higher speed was due to better engines.

Americans have shown their good sense by refusing to be penned up in such hen-coops as the English railway coaches. The American passenger coach has certainly a greater proportion of dead weight per passenger than English coaches, but then it is far more comfortable. If the inconveniences of the latter form an "economical system" in England, they certainly would never be endured in this country where the comfort of passengers is studied in preference to an adherence to conservatism and old fogy ideas. If light and incommensurate coaches are a matter of such importance in England, they would only be rendered a trifle more inconvenient and a good deal lighter, by dispensing with roofs and sides, and thus make the "economical system" so much admired by the writer of the article a question still more complete.

In America, where less money is expended in building from ten to twenty miles of road than in the construction of a single mile in England, equalizers are a necessity, and there are many "first-class" roads too in this country. As the writer says, "they (the equalizers) fix the weight on the wheels"—and I will beg leave to say that that is the point where the weight is needed—hence their utility. American engines do not, as a rule, require any rigging to decrease the weight on the drivers, for, unlike English engines, they are loaded with a sensible and paying load, such loads in fact as make any gearing to decrease the weight on the drivers a useless device, inasmuch as it would not be required once in a dog's age. If the writer of the article had suggested some device by which the weight could be increased, he would have written to some purpose, and his suggestion would have been appreciated by many railroad men just now. The equalizer is a necessity upon our roads in order to make an easy-riding and self-adjustable machine. Engineers who have broken an equalizer, and in disconnecting, chafed the springs to the frame, will understand its value, even if the springs are 38 or 40 inches long.

It has been said that a rose by any other name would smell as sweet, and I fail to see why a man who has the designation of "Locomotive Superintendent," is in any way superior to one who travels under the name of "Master Mechanic." The writer further says that "the American locomotive presents the unique spectacle of being almost identically the same all over the country, whereas in other machinery (presumably English locomotives) there is an endless variety," and draws the conclusion that American locomotives are inferior because of such uniformity. The truth of the matter is, that in this country we have "found the proper design" of engine for American roads, and all other roads for that matter, with the exception of those in England—the English engines having always proved a monumental failure outside of England, while the contrary is true of American engines put in use outside of our own territorial limits. The hankering after new designs, or a rearrangement rather of the typical English engine by English "superintendents," goes very far to prove that that overland machine is not all that could be wished, even in England. The writer of the article admits that English engines have proved to be failures in Canada and other British provinces; but he omits to mention that American engines have been a success in those localities, and especially in Canada, where they are, to a great extent, under the supervision of American master mechanics, and very frequently are run by American locomotive engineers, or drivers. Will the writer explain why it is, if the English engine is such a superior machine, that a certain locomotive-building establishment in Canada has been trying to secure the services of an American to build American engines for Canadian roads?

The writer says, apparently, that his judgment of the

superiority of the English locomotive has never before been publicly expressed in this country, except by Mr. Barnett le Van, of Philadelphia. With all due deference to this gentleman's acquirements in the line of mechanical research, it does not appear that he is a railroad man, or has ever been connected with a railroad, but that he is, on the contrary, a mechanical engineer, and a designer of economical stationary boilers. I entirely agree with the writer that American boilers are not thick enough for the pressure to which they are subjected, and that the factor of safety is too small. But still, the infrequency of locomotive boiler explosions goes far to justify American practice in this respect. The writer considers the locomotive plate-frame as superior to the bar-frame, but I am unable to perceive in what the superiority consists. The plate-frame appears to have been in use on English engines almost from the start, and the tendency of their builders to adhere to old time ideas still keeps it in use. The American frame, however, I consider superior because it combines in a scientific form the least amount of iron and in the stiffest shape. The plate frame is at best a piece of patch-work, such a one in fact as a man might be expected to get up if he were required to build it out of the odds and ends of a scrap pile. It allows a wider grate, to be sure, but as the grate surface can be increased by extending the fire-box forward and back below the axles, the advantage claimed is not very manifest. If this frame were introduced upon our engines and roads, it would, from its want of lateral stiffness, require extra braces, which would only add to the patch-work. This is avoided by a scientific frame, such as the American frame really is, and which, from its construction, forms a braced structure of itself. In many of our locomotives there are no braces between the frame and boiler, and the frame has all the vertical stiffness of a plate frame. The back braces on our engines, from boiler head to frame are not always considered necessary, and are frequently left off. I have seen 34-ton engines with the back braces off, jacked up under the extreme back end of the foot-board, with no signs of giving in the frame. If the writer of the article referred to will examine the American frame, he will notice the resemblance in principle to the Howe truss bridge, which gives vertical stiffness without superfluous material. I fail to see where the "perniciousness" of back braces comes in, as they are provided with slotted holes on the feet to allow the boiler to expand, and they certainly serve to keep an engine in shape when she leaves the track and turns on to her side in the ditch, as well as in front collisions. In what then, I would ask, does the "perniciousness" consist? And, furthermore, it does not appear that the plate-frame is the cheaper; for while with the steam-hammer and other modern appliances, the American frame is a simple forging, the plate-frame must be drilled and slotted out with no end of waste material.

As to springs and tires, there does not appear to be any trouble with those in use in American practice, nor with our rods, piston heads and piston rods. The necessity of enlarging the latter where it enters the piston head, has never occurred, and the writer of the article admits that American engines haul heavier loads than those of the English type. The idea of splitting a gland to remedy a fault that does not exist, is not a good one. The plan of bolting the "tube-plate" (which has enough to do in supporting the flues) to the "cross-girders," would be condemned by an American apprentice in engine construction, to say nothing of using angle-iron when a flange on the flue-sheet has long been demonstrated to be the best. The writer, in another part of his article, condemns the practice of bracing the boiler to the frame, but now holds up as a superior piece of wisdom the bolting of the flue-sheet, practically, to the cylinders. Consistency is a good thing, but just here it is not very strikingly apparent. The costliness of a crank shaft and its liability to break, have caused it to be discarded long since by American builders, and to give place to the simpler and cheaper outside cylinder arrangement. As to valve travel, 4 inches may do for English engines, but 5 or 5½ inches is one of the superior features of our own. The sand-box idea of the writer is another characteristic of English practice. For two sand-boxes, double the amount of levers and other rigging must be used to do what is done by one box as used by us; and, by the way, the writer forgets to mention who invented the sand-box and the use of sand in the running of locomotives. If I mistake not, it originated upon this side of the water.

The alleged superiority of English engines can not be established by mere assertion, and this is all the writer in question has urged in their behalf. In his particulars and specifications he signally fails to make out his case. Not only has the American type of engines been approved wherever introduced outside of England, but their superiority has been strikingly apparent whenever the two types have been brought into direct competition. Will the writer be so good as to explain, if the English engine has so many points of superior excellence, why it is that the "Locomotive Superintendents" do not adopt a more economical valve motion than the link; and if the link really is as economical a cut-off device as the *Engineer* would have its readers believe, why do not the astute English stationary engine builders adopt it for a first-class high speed automatic cut-off engine, instead of pirating the American Corliss engine? The builders of the Porter Allen, Buckeye, etc., stationary high speed engines find it impossible to build an economical engine with a single valve. Why, then, are the "superior" English locomotive engines allowed to run with a valve motion inferior to that which is in use in stationary engines, which in the matter of working speed equals the locomotive, and is therefore, so far as the use of steam is concerned, identical with the locomotive?

FRANK C. SMITH, M. E.

#### Uniformity in Train Signals.

To the Editor of the National Car-Builder:

A great deal is just now being said and written to impress railroad men with the importance of uniformity in the running gear of freight cars. This is all very well; but allow me to say that the benefits of uniformity have a still wider application in the economy of railroad operation. There is room for a much needed reform in the matter of train signals, which, as almost every one knows, are at present exceedingly diversified. There is no universally accepted systematic code, nor is there any very perceptible progress toward such a consummation, although the necessity for it increases every year with the extension of roads and increase of traffic. Train men are perhaps more directly interested in this subject than the companies that employ them. At all events, the brunt of the responsibility devolves upon them when any thing goes amiss, to say nothing of the personal peril to which they are exposed in case of accident. The evils arising from different rules in regard to whistle, lamp and flag signals upon different roads, are becoming more and more a subject of complaint by this class of railway employes, especially in cases where several roads use the same track for terminal facilities, or where a "line" makes use of the tracks of several roads. They say that after becoming thoroughly drilled in the signals of one road, their knowledge is useless and even worse than useless on the next, where the interpretations of the same signals are in some cases exactly opposite. It can hardly be expected that the same men will always serve on the same road to avoid learning a new code. Slack business on one line, or the prospect of better pay on another, will cause them to change their location, and of necessity they must in such case unlearn what they knew before and familiarize themselves with a new system of regulations. In sudden emergencies when danger is imminent and excitement unavoidable, the best disciplined mind is apt to fail its possessor and become confused in matters of detail; but what better can be expected of even the most experienced transportation hand who is trying to forget what he has long been accustomed to and learn what is new and unfamiliar. It is useless, perhaps, to dwell upon evils that are so well known to every railroad man, or to point out in detail the bad features in the various signal codes now in use. My object is only to contribute my small mite in behalf of a more uniform, better understood, and as far as possible, automatic system of signals, by calling attention to a subject that is of vital importance to railroad interests generally, as well as to every

TRAIN MAN.



[JULY, 1881.]

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EDITORIAL ANNOUNCEMENTS.

**Addresses.**—Business letters should be addressed, and drafts and money orders made payable, to THE NATIONAL CAR-BUILDER. Communications for the attention of the Editor should be addressed EDITOR NATIONAL CAR-BUILDER.

**Advertisements.**—Nothing will be inserted in this journal for pay, except in the ADVERTISING COLUMNS. The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.

**Contributions.**—Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.

**SUBSCRIPTIONS** to the CAR-BUILDER will be received, and copies kept for sale, at the following places:

- A. WILLIAMS & Co., 283 Washington Street, Boston, Mass.
- L. SCHAFFNER, Cigar and News Dealer, Grand Pacific Hotel, Chicago, Ill.
- WILLIE H. GRAY, 306 Olive Street, St. Louis, Mo.
- ROBERT CLARK & Co., 65 West Fourth Street, Cincinnati, Ohio.

THE CAR-BUILDERS' CONVENTION.

The annual meeting of the car-builders this year was not essentially different from that of last year. The number of members in attendance was about the same, and the usual amount of business was transacted. If no final or decisive action was taken upon any of the subjects which came up for consideration, it was because they are not of such a nature as to admit of being definitely disposed of. Even with respect to those particular appliances in regard to which it is so highly important to have standards that shall be recognized and adhered to, it is no easy matter to reach a point at which, by unanimous consent, or even by the consent of a considerable majority, discussion shall be closed and the final decision proclaimed. Yet this is what is aimed at, and what constitutes the burden of committee reports and discussions from year to year. Suppose things go on in this way indefinitely, with no result but a gradual diminution of the evils of diversity. Can it be said that nothing is accomplished to justify the expenditure of time

and labor in trying to reach the unattainable? No. Every continuation of a committee upon any of these topics is really a step in advance; every postponement is a victory. It is only by comparing the character of the appliances in use at periods separated by intervals of several years that the actual progress made can be clearly perceived. From such a test the Car-Builders' Association need not shrink? Whatever may have been its influence so far upon railway development, it has been a steadily growing influence. The prodigious growth of traffic, the enormous increase in the number of cars, and the extent to which they are interchanged between different roads, have made and will continue to make the economical construction, repairing and management of this branch of railway equipment the great leading feature of the system. The Association must keep abreast with the movement, and prove itself equal to the responsibilities it imposes. It cannot remain stationary. Its halting place to-day must be its starting place to-morrow. It is not at all surprising that propositions to "increase its efficiency" have been the subject of discussion at the last two meetings—a circumstance that implies, not that it has been inefficient in the past, but that it must of necessity be more efficient in the future.

We need not recapitulate the doings of the convention, but refer our readers to the regular report, to which we devote considerable space. The remainder of the proceedings will appear in our next issue, including some committee reports which we are unable to make room for in this number. It is evident to every one who is present at these meetings that the discussions upon the various subjects presented are the most interesting part of the proceedings, and as such are listened to with marked attention, although but a comparatively small number of the members take part in them. We have been obliged to condense the verbatim report somewhat, in order to avoid repetitions and superfluities which are liable to creep into impromptu remarks that take on the form of conversation at times and become quite informal. We have aimed, however, to leave out nothing that is essential, and to retain the spirit and meaning.

In the course of these discussions, as well as in the framing and tenor of the committee reports, there is a stumbling-block which intrudes itself more or less at every meeting, and is a source of embarrassment whenever it is proposed to adopt—or, to put it more mildly—to recommend, some particular appliance that is handicapped with a patent. We allude to the difficulty of setting forth the merits of any patented appliance without seeming to advocate the claims of the patentee and to advertise his wares. It is a difficulty which in the nature of the case is unavoidable, except by a modification of the existing clause in the constitution of the Association, which, constructively at least, causes the intrinsic value of an invention to be sacrificed to the policy of not recommending it because it is patented. There is no getting around the fact that certain mutual relations exist between inventors and the car departments of railroads as represented in the Association, and it seems to us to be a matter of the utmost importance that these relations should be more clearly defined and understood. The confusion and uncertainty which exist in the minds of members on this subject is fairly illustrated in the remark of Mr. Marden, that had the committee on the subject of brake-shoes felt itself at liberty to recommend forms that were patented, a very different report would have been made by the committee than was made. Without enlarging upon the matter, however, it does seem that the attitude of car-builders toward inventors is, or should be, wholly in reference to the value of inventions—their cost, of course, being duly considered—and not at all in

reference to the private interests of patentees, these being altogether an outside matter. What is wanted are the best mechanical appliances, provided they do not cost more than they are worth.

The report of the Committee on Freight-Train Brakes is a very satisfactory one, and shows that steady progress is being made in the solution of this most difficult problem. Several devices have been tested in a small way, and have proved successful; and in order to make the tests more complete, the committee recommends that each of the devices be tried upon trains of 50 cars, with from 25 to 75 per cent. of the cars not fitted with the brakes, and running at a speed of from 15 to 30 miles an hour in long trains. Considering the great disadvantages under which the committee has labored, owing to the lack of time and means for making practical experiments, its members are entitled to great credit for placing this matter in such a light that a freight-train brake is no longer regarded as chimerical and visionary.

The report of the committee to prepare new drawings of standard oil-box and pedestal will receive the attention its importance demands. The drawings have been engraved by the *Railroad Gazette*, to whose courtesy we are indebted for the use of the cuts in the supplement which accompanies our present number.

A rule was adopted requiring reports of committees and papers to be presented at the annual meetings, to be printed and distributed among the members on the first day of the session—a rule that should have been adopted and enforced years ago. The election of officers was postponed until next year, which is equivalent to a reappointment of the old ones for the current year. The next year's meeting will be held in Philadelphia.

The members of the Car-Builders' Association who were in attendance at the recent convention were very handsomely entertained during their stay in the city. The numerous visitors, consisting of the representatives and members of supply manufacturers and dealers from near and distant points, evinced their liberality by contributing a large proportion of the needful for defraying the necessary expenses. Tickets were furnished for the theatres, and carriages were in readiness during each day for the use of the members and their families. On Thursday afternoon they were treated to an excursion to Coney Island at which place a banquet was provided, all of which was very enjoyable, owing to the favorable weather, the excellence of the arrangements, and the courtesy of Messrs. Douglas and Sheldon, of the New York & Sea Beach Railroad, in furnishing free transportation. The committee in charge of the entertainments consisted of Mr. H. A. Little and Mr. C. D. W. Gibson, of New York, Mr. George W. Morris, of Pittsburgh, and Mr. George W. Peck, of Boston.

The patent on the Allen valve having expired, it is beginning to receive the attention it deserves, and is now in use upon many of the fast locomotives that have recently been built. A letter on another page from Mr. W. A. Lewis, master mechanic of the Morris & Essex Division of the Delaware, Lackawanna & Western road, in regard to its performance, will interest many of our readers.

It is noticeable that the shed now is for heavier locomotives than were formerly used; so that a given number of engines sent from the shops now will represent a much greater motive power than any equal number turned out a few years ago.

MR. R. M. VAN ARSDALE, the proprietor of the CAR-BUILDER, sailed for Europe on the 25th ult., and will be absent until October.



### Exhibition of Inventions and Appliances at the Car-Builders' Convention.

One of the interesting features of the recent convention was the exhibit of models and railway appliances at the Park Avenue Hotel, in this city, comprising a large number of inventions, some of which are already in successful operation upon the roads, and others in a fair way of being speedily introduced. Among them we note the following:

HOOPES & TOWNSEND, Philadelphia, Pa.—Cold-Punched Nuts, Bolts, Washers, Rivets, Screws, etc.

ATWOOD SAFETY-NUT CO., Springfield, Mass.—Atwood Safety-Nuts.

CONTINUOUS DRAW-BAR CO., Philadelphia, Pa.—Models of Continuous Draw-Bars.

GLOBE VENTILATOR CO., Troy, N. Y.—Ventilators for Cars, Depots, etc.

GARDNER & CO., New York.—Perforated Veneers and Car Seats.

D. F. VAN LIEW, Aurora, Ill.—Self-Operating Grain Car Door.

GEO. W. READ & CO., New York.—Cabinet Woods, Veneers, etc., used in car construction.

VULCANIZED FIBER CO., Wilmington, Del.—Hard and Flexible Vulcanized Fiber for Dust-Guards, Oil-Box Covers, etc.

WAKEFIELD RATTAN CO., Boston, Mass.—Rattan Seats and Seat-Backs.

PRESCOTT MANUFACTURING CO., Boston, Mass.—Box Car Door-Hanger and Fastener.

HALE & KILBURN MANUFACTURING CO., Philadelphia, Pa.—Canvas Back Rattan Car Seating, Flexible Top Spiral Springs, and Cobb's Elliptic Steel Seat Springs.

J. BERNARD, New York.—Marqueterie, Veneers, etc.

E. MILLER, New York.—Ventilating Window for Railway Cars.

METSTAND METAL CO., Jersey City, N. J.—White and Bronze Metals for all kinds of Bearings.

DAVIS LEVEL & TOOL CO., Springfield, Mass.—Johnson's Patent Car Brake for Box and other Freight Cars.

TALLMAN AUTOMATIC CAR BRAKE CO., New York.—Tallman Continuous Train Brake for Freight Cars.

BELDEN & CO., Putnam, Wash. Co., N. Y.—Belden's Metallic Paint, largely composed of iron.

GEORGE BUTLER, Cincinnati, O.—Excelsior Draw-Bar Attachment; Buffer and Spring Protector for Railroad Cars.

FEERLESS MANUFACTURING CO., New York.—Wire-Covered Connecting Hose, Air Brake Tubes and Diaphragms, and Vulcanized Rubber Fabrics.

NATIONAL RAILWAY PATENT WASTE CO., New York.—Cotton Seed Hull Waste for packing Car Journal-Boxes.

THO. HIBBERT, Aurora, Ind.—Continuous Draw-Bar and Grain Car Door.

FRED. A. HOENLETTE & CO., Boston, Mass.—Marden's Patent Drop Stake for Platform Cars.

WILLARD H. SMITH, New York.—Car Lamps, Reflectors, Lanterns, Gasoline, Fixtures, etc.

GEO. R. MENEELY & CO., Troy, N. Y.—Hopkins' Patent Self-Fitting Journal Bearings for Railway Cars.

D. A. HOPKINS, New York.—Patent Self-Fitting Journal Bearings.

ROSSIE IRON ORE PAINT CO., New York.—Fire and Water-Proof Mineral Paint for Cars, Boats, Bridges and all kinds of Iron Work.

HERSHEY BROTHERS, South Boston, Mass.—Freight Truck Spring Equalizer.

ANDREW WARREN, St. Louis, Mo.—"Standard" Car Door Fastener.

TROY MALLEABLE IRON WORKS, Troy, N. Y.—Refined Air-Furnace Castings in Malleable Iron; Extra heavy Screw Wrenches.

G. H. AMES, Adrian, Mich.—Ames Automatic Freight Car Coupler.

E. P. KELLOGG, New York.—Improved Sleeping Car, in reference to Berths and Sections.

EAGLE CAR BOX LUBRICATING CO., New York.—Eagle Car Box Lubricator; a remedy for hot boxes.

ALLEN MIDGERTON, Philadelphia, Pa.—Denison's Cooling and Lubricating Compound.

RUSSIA CEMENT CO., New York.—Russia Belting Cement, Glues and Sizing.

G. F. GODLEY, Philadelphia, Pa.—Double Elastic Continuous Draw-Bar for Railroad Cars.

ROBINSON CAR BOX CO., Columbus, O.—Improved Car Axle Box.

SUSPENSION CAR TRUCK CO., New York.—Improved Car Truck for traversing curves without shock or jar.

G. W. LARAWAY, Hartford, Conn.—Compound Toggle-Arm Power and Hand Brake.

OTIS T. BEDELL, New York.—Improved Fish-Plate and Rail-Joint.

R. A. COWELL, Cleveland, O.—Continuous Platform and Automatic Coupling for Passenger Cars.

ADAMS & MATTHEWS, Buffalo, N. Y.—Freight Car Coupler.

HENRY EMPEY, Detroit, Mich.—Continuous Brake for Freight Trucks.

GRISWOLD SHERWIN, Agent, New York.—Hurricane Railroad and Steamship Lamps, Lanterns, Globes, Shades, Burners, etc.

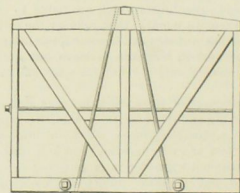
AMERICAN BRAKE CO., St. Louis, Mo.—Continuous Brake for Freight Trains.

BAKER'S Universal Car Axle Joint and Reversible Safety Bearing.

### End-Framing of Box Cars.

To the Editor of the National Car-BUILDER:

I am compelled to differ with all your correspondents so far in regard to end-framing. In Nos. 1 and 2 (April) CAR-BUILDER the distance from stud to corner-post is



not sufficient to maintain the rectangular form of the car end; and although No. 3 meets this requirement, I regard it as the weakest of the three. In preference to these, I submit another method, as shown in the accompanying diagram, upon which I would ask an expression of opinion.

D. W. H.

CURRIAN & WOLFE, of Chicago, have contracted to furnish one of their Excelsior Lumber Dryers to the Richmond & Danville, and Charlotte, Columbia & Augusta roads.

### Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

Atlantic, Mississippi & Ohio.—The name of this road has been changed to Norfolk & Western.

Baltimore & Ohio.—Mr. L. Packard is now Master Car-Building at the Mount Clare shops, Baltimore. He was formerly on the New York, New Haven & Hartford.

Chicago, Burlington & Quincy.—Mr. John Christensen has resigned his position as Mechanical Engineer, to take charge of a large car-wheel foundry at Pullman, near Chicago. Mr. R. Hitchcock has resigned his position as Superintendent of the Galveston Division.

Chicago & Northwestern.—Mr. J. B. Layne has been appointed Superintendent. He has for a number of years been General Manager of the Pennsylvania Company.

Chicago, St. Paul, Minneapolis & Omaha.—Mr. George V. Mortford has been appointed Superintendent of the Nebraska Division (Sioux City to Omaha), with office in Omaha, Neb.

Green Bay & Minnesota.—The name of this road has been changed to Green Bay, Winona & St. Paul.

Houston, East & West Texas.—Mr. J. E. Wiggin, Master Mechanic, has resigned to accept a position on the Hannibal & St. Joseph, at Brookfield, Mo.

Massachusetts & Brunswick.—Mr. C. E. Armstrong has been appointed Purchasing Agent, West W. C. Jones.

New York, Lake Erie & Western.—Mr. O. Chanute has been succeeded as Assistant General Superintendent by Mr. Benj. Thomas, Superintendent of Delaware Division, and Mr. Thomas is succeeded by Mr. Charles Neilson. Mr. Chanute will hereafter devote his whole time to the Engineering Department.

Pennsylvania.—Mr. S. M. Prevost has been appointed Superintendent of the Philadelphia Division in place of W. F. Lockard, resigned; H. H. Carter, Superintendent of Middle Division, in place of S. M. Prevost; J. B. Hutchinson, Superintendent Frederick Division, in place of Mr. Carter; Wm. M. Phillips, Superintendent Lewistown Division, in place of Mr. Hutchinson.

Union Pacific.—Mr. James McKenzie, Sr., has been appointed Master Mechanic of the Kaw Valley Division, with office at Armstrong, Kan., in place of James Long, who has gone to the Hannibal & St. Joseph.

Vicksburg, Shreveport & Pacific.—This company has been reorganized. Mr. John Scott is Vice-President and General Manager.

LOWE'S METALLIC PAINT is an excellent protection for metallic surfaces, and especially for iron and tin roofs. It effectually prevents oxidation and corrosion, requires much less oil than many other paints of this class, and as it is not calcined nor burnt, its color remains unchanged. It mixes well and spreads smoothly, and is perfectly fire proof, containing, as it does, not less than 55 per cent. of iron. For freight cars, especially, it is well adapted for its durable qualities, economy in the use of oil and cheapness. Manufactured by Lowe's Metallic Paint Co., Chattanooga, Tenn.

### CONTINUOUS DRAW-BAR PATENTS.

The following circular has been issued by the Secretary of the Western Railroad Association:

CHICAGO, Sept. 9, 1880.

To the Members of the Association:

GENLEMEN: Claims have been pending for several years that the Continuous Draw-Bar sold by the Continuous Draw-Bar Company under the Middleton and the Griffith and Patterson patents is an infringement of patent 71,280, granted 2d December, 1807 (reissue No. 8,065, granted 19th February, 1878), to Edward L. Caum.

This Association has continuously advised against entertaining this claim, but to quiet all questions, and at our instigation, the Continuous Draw-Bar Company has recently purchased a full and absolute release to all the members of the Eastern and Western Railroad Associations from any and all liability for, or on account of, any infringement heretofore of said patent.

Yours truly,

J. H. RAYMOND, Secretary, etc.

### CAR WORKS, FOR SALE OR RENT.

Swissvale Car Works, eight miles east of Pittsburgh, Pa., on the Pennsylvania Railroad. Complete and now in operation. Capacity, seven cars per day. Planing mill 128 x 73 feet. Machine and Blacksmith shop, 132 x 50 feet. Erecting shop, 220½ x 75 feet. Offices and store room, 50 x 30 feet. Buildings are of brick with iron roofs. Apply to

JAMES H. HOPKINS,

Pittsburgh, Pa.

**WILLIAM SELLERS & CO.,**  
**PHILADELPHIA.**  
 Iron and Steel Working Machine Tools, for Railways, Machine Shops, Rolling Mills, etc.  
**TURN TABLES,**  
**PIVOT BRIDGES,**  
**SHAFTING.**  
**BRANCH OFFICE:**  
 79 Liberty Street, New York.



JULY, 1881.

factory.

changes since our last  
d to give us prompt  
occur.

The name of this road  
Western.

ward is now Master  
ships, Baltimore, Md.  
& New Haven & Hart-

Mr. John Christian,  
chemical Engineer, is  
foundry at Pullman,  
has resigned his posi-  
tioning Division.

J. D. Lavy has been  
has for a number of  
the Pennsylvania Com-

sis & Omaha. Mr.  
intel Superintendent  
City to Omaha, with

name of this road has  
as & St. Paul.

J. E. Wiggins, Master  
of a position on the  
Md. Mo.

Armstrong has been  
W. C. Jones.

Mr. O. Christie  
General Superintendent  
Division of Delaware  
owed by Mr. Christie  
for service in whole  
nt.

has been appointed  
Division in place of  
arter, Superintendent

M. Provost; J. E.  
ack Division, in place  
lye, Superintendent  
r. Hutchinson.

Lezie, Sr., has been  
Law Valley Division,  
in place of James  
d & St. Joseph.

This company has  
in Vice-President and

an excellent grade-  
especially for iron  
prevents oxidation  
less oil than many  
it is not calcined  
changed. It mixes  
d is perfectly fine  
at less than 55 per  
specially, it is well  
s, economy in the  
ufactured by Lowe's  
Tenn.

R PATENTS.

used by the Secretary

Sept. 9, 1880.

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the Cautious Treat-  
the Griffith and Pat-  
tent 71,861, granted  
dated 1863 February.

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sistency has recently  
invented in the al-  
all the members of  
nation from any and  
imagined heretofore

son, Secretary, etc.

OR RENT.

of Pittsburgh, Pa., on

and now in operation

mill 128 x 75 feet.

feet. Erecting shop,

10 x 30 feet. Build-

to

KINS,

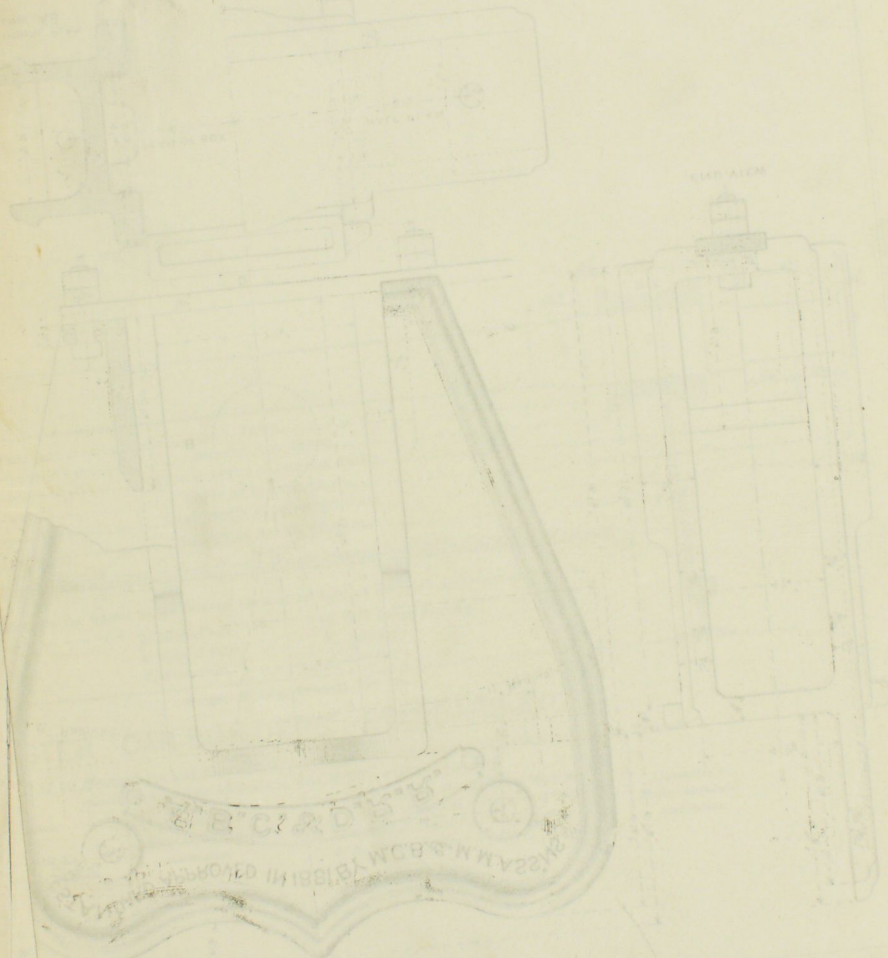
burgh, Pa.

JULY, 1881.]

THE NATIONAL CAR-BUILDER.

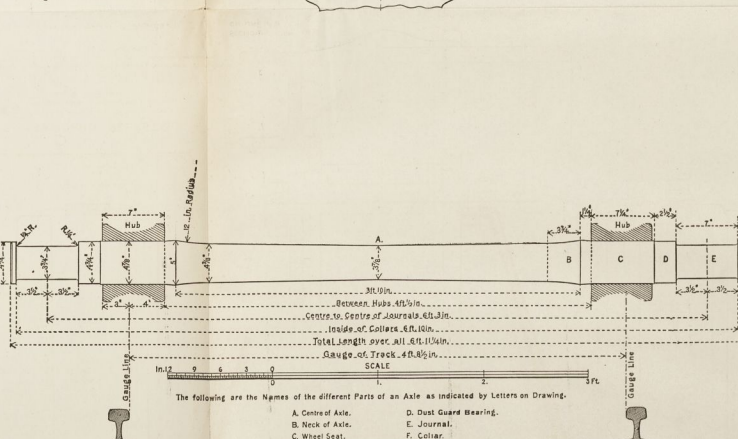
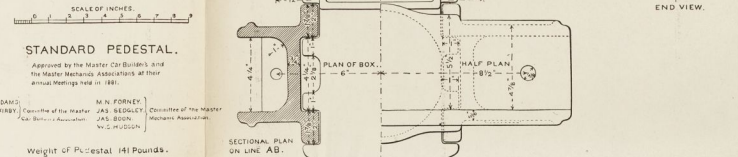
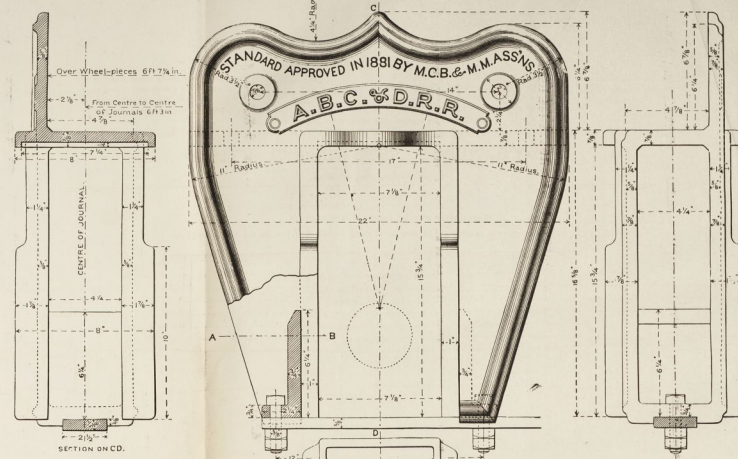
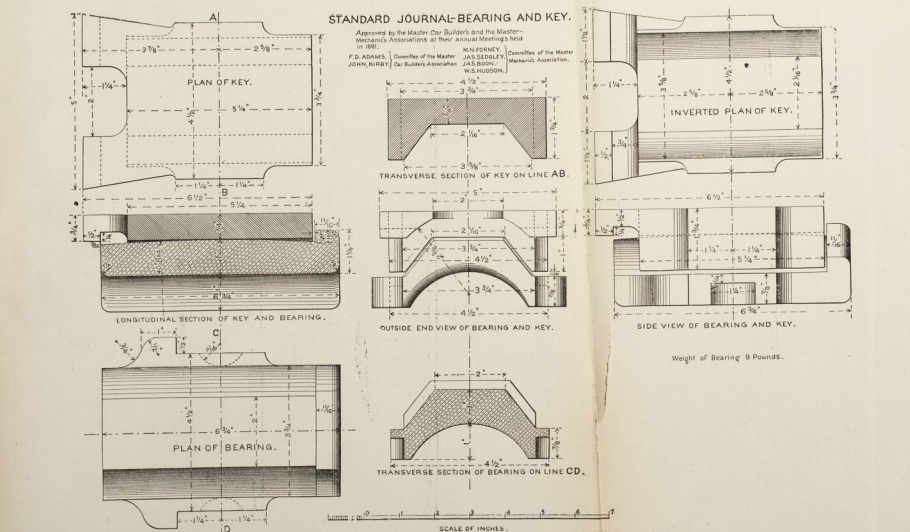
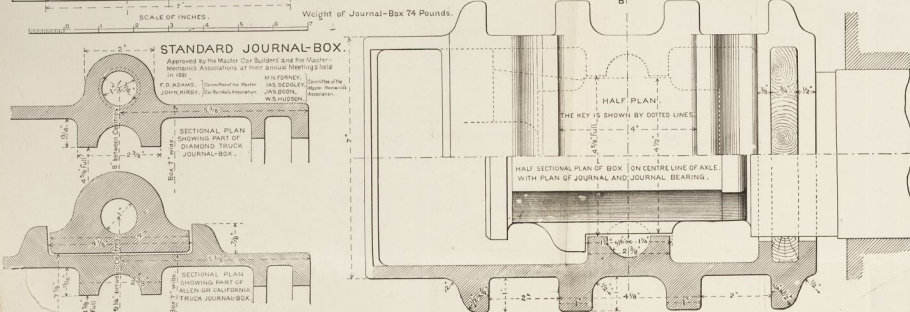
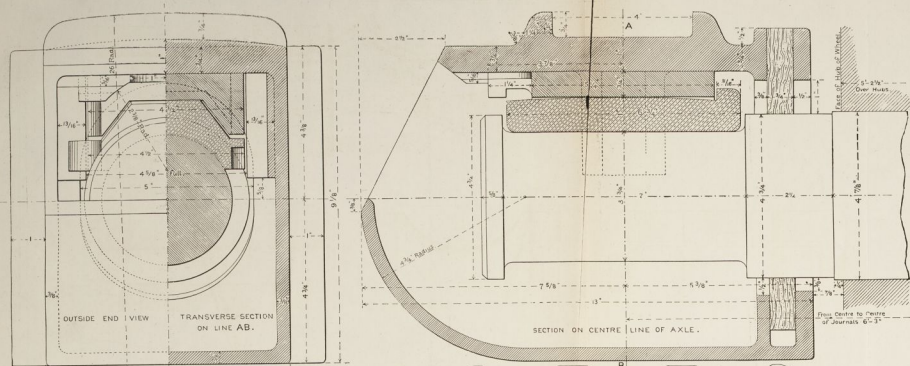
ix

# CLARENCE BROOKS & Co.



PRICES AND PHOTOGRAPHS ON APPLICATION.





**MASTER CAR-BUILDERS' STANDARD-AXLE.**

The engraving hereof of the Standard Car and Tender Axle, recommended by the Master Car-Builders' and Master Mechanics' associations, at their conventions, held in 1879, is hereby approved.

**Committee of Master Car-Builders' Association.**

F. D. ADAMS, Boston & Albany Railroad.  
M. N. FOSBERY, Railroad Gazette.  
JOHN KIRBY, Lake Shore & Mich. South Ry.  
S. A. DAVIS, Boston, Lowell & Nashua Railroad.

**Committee of Master Mechanics' Association.**

H. L. COOPER, Ind., Birmingham & West. Ry.  
J. M. BOW, Pittsburgh, Fort Wayne & Chicago Ry.  
W. S. HENSON, Rogers Locomotive Works.  
M. N. FOSBERY, Railroad Gazette.

Steam Hammers.



For Railroad, Locomotive and Car Shops.  
All From New and Improved Patterns.  
PRICES AND PHOTOGRAPHS ON APPLICATION.



JULY, 1881.

[JULY, 1881.]

THE NATIONAL CAR-BUILDER.

ix

# CLARENCE BROOKS & Co.

MANUFACTURERS OF

## RAILWAY CAR AND FINE COACH VARNISHES.

Cor. West and West 12th sts., New York.

JOHN W. MASURY & SON,  
MAKERS OF STRICTLY FIRST-CLASS  
**RAILWAY VARNISHES,**  
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By permission, we refer to the following Companies, for whom we have made Special Colors:

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PENNSYLVANIA CO., Wm. Mullins, General Purchasing Agent, Pittsburg, Pa.	KANSAS
BALTIMORE & OHIO RAILROAD CO., N. S. Hill, Purchasing Agent, Baltimore Md.	CHICAGO, BURLINGTON & QUINCY RAILROAD CO., Wm. Irving, Purchasing Agent, Chicago, Ill.
CHICAGO & ALTON RAILROAD CO., A. V. Hartwell, Purchasing Agent, Chicago, Ill.	LOUISVILLE, CINCINNATI & LEXINGTON RAILROAD CO., Wm. Mahl, Purchasing Agent, Louisville, Ky.
CHICAGO & NORTHWESTERN RAILROAD CO., R. W. Hamer, Purchasing Agent, Chicago, Ill.	GRAND TRUNK RAILWAY N. Wall, Port Huron, Mich.
LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.	LITTLE ROCK & FORT SMITH RAILROAD CO., T. Hartman, Purchasing Agent, Little Rock, Ark.
NORTHERN RAILROAD OF CANADA, F. W. Cumberland, Superintendent, Toronto, Ont.	GILBERT & HUSH CO., Troy, N. Y.
NAUTATUCK RAILROAD CO., G. W. Beach, Superintendent, Waterbury, Conn.	WASON MANUFACTURING CO., Brightwood, Mass.
PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.	BILLMEYER & SMALL MANUFACTURING CO., York, Pa.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD CO., R. N. Dowd, Commissary, New Haven, Conn.	JACKSON & SHARP CO., Wilmington, Del.
	BARNEY & SMITH MANUFACTURING CO., Dayton, O.

The advantages derived from the use of such Special Colors are many, a few of which are found below:

**ABSOLUTE UNIFORMITY OF SHADE.** **DURABILITY.** As we use perfectly pure materials, **SAVING OF MONEY,** because of small quantity required. **SAVING OF TIME,** in the putting on of the same. **SAVING OF LABOR AND MATERIAL,** as no extra amount of Varnish will be required to hide a sanded surface. **LARGER DEGREE OF CERTAINTY** that there will be an absence of cracked work, as our mixtures are all uniform, being done by weight only. We make any desired shade, it only being necessary that purchasers furnish us with sample of color desired, stating the time they would like to have the paint dry in. We shall be glad to furnish samples and give prices to any who may wish to avail themselves of the above advantages.

Very respectfully,  
**JOHN W. MASURY & SON, New Yrk and Chicago.**  
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MANUFACTURERS OF

**FINE COLORS,**



**DRY AND IN OIL.**

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PAINTS AND COLORS, RED AND WHITE LEAD, ORANGE MINERAL, DROP BLACKS, ULTRAMARINE AND PRUSSIAN BLUES, YELLOWS AND GREENS, AND IRON OXIDES, ALL OF FINEST QUALITIES, DRY AND IN OIL, SPECIALLY PREPARED FOR RAILROAD USE.

Factories: Manhattantville. Office: 16 Murray Street and 19 Park Place, New York.

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No. 24 Columbia St., New York,

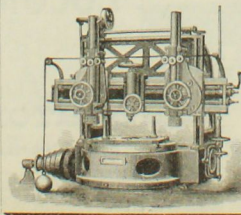


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**HYDRAULIC JACKS, PUNCHES,  
BOILER-TUBE  
EXPANDERS,**

AND  
**DIRECT ACTING  
Steam Hammers.**

JACKS FOR PRESSING ON  
CAR-WHEELS OR CRANK-  
PINS MADE TO ORDER.

Communication by letter  
will receive prompt attention.



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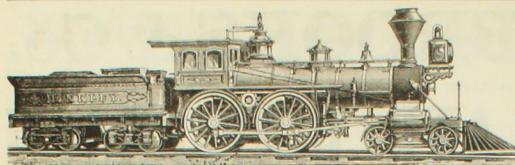
**MACHINE TOOLS.**

For Railroad, Locomotive and Car Shops.

All From New and Improved Patterns.

PRICES AND PHOTOGRAPHS ON APPLICATION.





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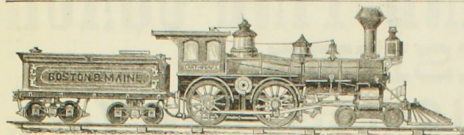
(ESTABLISHED IN 1839.)

439 ALBANY ST., BOSTON, MASS.

This Company, having been reorganized, is prepared to receive orders for Locomotive Engines and Tenders, Boilers and Tanks, and to execute such orders promptly at fair prices for the best work.

FRANKLIN D. CHILD, Superintendent.

GREELY S. CURTIS, Treasurer.



## MANCHESTER LOCOMOTIVE WORKS,

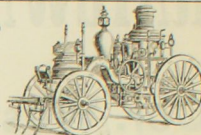
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LOCOMOTIVES

AND THE  
AMOSKEAG STEAM FIRE-ENGINE.

JOHN A. BURNHAM, President.

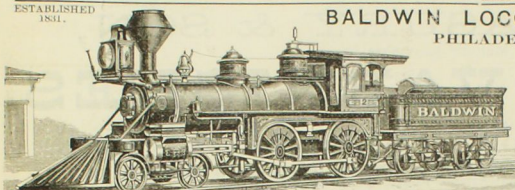
WM. G. MEANS, Treas., Boston, Mass.

ARETAS BLOOD, Agent, Manchester, N. H.



ESTABLISHED  
1831.

## BALDWIN LOCOMOTIVE WORKS, PHILADELPHIA, PA.



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MANUFACTURERS OF

WM. P. HENSZLEY

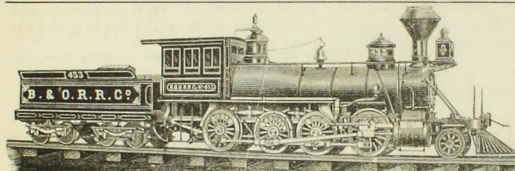
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LOCOMOTIVE ENGINES.

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H. A. ALLEN, AGENT.

JOHN COOKE, President

J. T. BLAUVELT, Vice-Pres.

PATERSON, N. J.

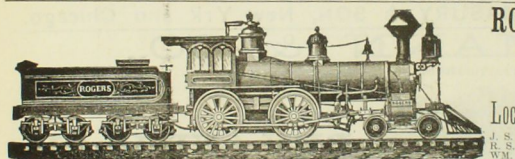
WM. BERDAN, Sec. & Treas.

JAMES COOKE, Supt.

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Locomotive Engines and Tenders and other Railroad Machinery.

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R. S. HUGHES, Treas.,

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Pittsburgh Locomotive Car Wrks,  
PITTSBURGH, PA.

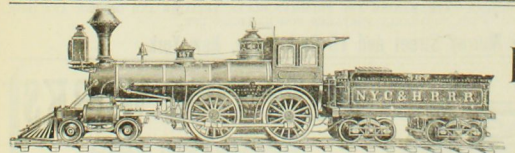
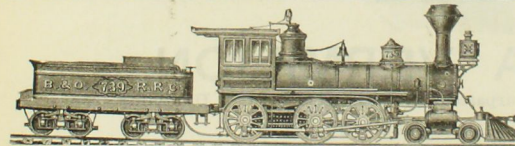
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Tanks, Locomotive or Stationary Boilers Furnished  
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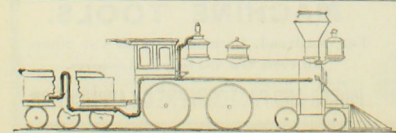
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WALTER McQUEEN, Vice-President.

SCHENECTADY, N. Y.

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271 Franklin Street, Boston, Mass.



The Ashton Blow-back Safety Valve is constructed so as to conduct the escape steam which is blown off back to the boiler, or to the smoke box and up the chimney. By this arrangement the heat of the escape steam, instead of being wasted as is when an ordinary safety valve blows off, is communicated to the cold water in the boiler. This not only results in an important economy, but it renders the escaping steam noiseless, and the increase of temperature of the water has a tendency to deposit some of its impurities before it is pumped into the boiler. It thus stops the waste of steam and all engines steam better and faster, and do more effective work with these valves than with those in ordinary use.





[JULY, 1881.]

THE NATIONAL CAR-BUILDER.

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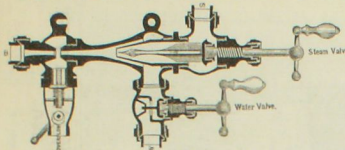
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TRADE

LOCOMOTIVE

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Wrought-Iron Pipe and Tubes, all sizes.

Special Semi-Steel Tubes for Locomotives.

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MACK'S PATENT INJECTOR.

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THE PATENT VERONA SPRING WASHERS.

These SPRING WASHERS will be found very valuable in Cars, Locomotives, and Bridges, or any place where it is desired to have a tight nut.

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HEAVY CASTINGS AND FORGINGS.

A. A. THOMSON & CO.,

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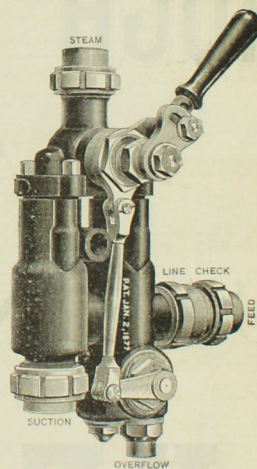
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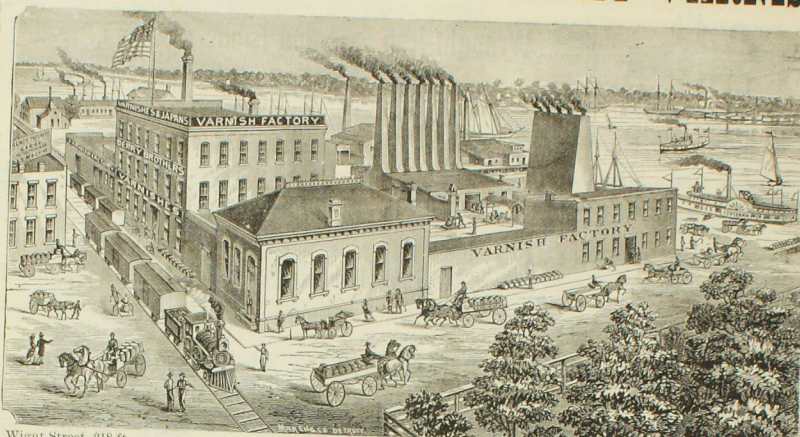


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ESTABLISHED IN 1858.  
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RAILWAY VARNISHES.



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Southeast Corner John and Augusta Streets,  
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Boiler	Master Mechanic	Master Cox-Builder	Residence
1	2	3	4

Baltimore & Ohio	John C. Davis	L. Packard	Baltimore, Md.
Baltimore & Ohio	L. N. Kaibach	James H. Mill	Baltimore, Md.
Baltimore & Ohio	Wm. Edwards		Marblehead, Mass.
Baltimore & Ohio	Wm. Houston		Pleasanton, Va.
Baltimore & Ohio	Robert Maxwell		Parkersburg, W. Va.
Baltimore & Ohio	Chas. Hirsch		Wheeling, W. Va.
Baltimore & Ohio	S. B. Crawford		Zanesville, O.
Central Ohio Division			Newark, O.
Ohio & Chicago Division	W. H. Harrison		Newark, O.
Central Ohio Division	E. L. Weisgerber		Bellairs, Va.
Central Ohio Division	H. M. J. Imhoff		Sandusky, O.
Lake Erie Division	And. Becker		Garrett, Ind.
Chicago Division	W. E. Stanton		Chicago, Juneo. O.
Chicago Division	Geo. Wilson		Kingslinn, Ill.
Central Ohio Division	W. H. Sampsel		Philadelphia, Pa.
Baltimore & Potomac	Wm. H. Soule		Baltimore, Md.
Bath & Eastern Division			Hann ower, Mo.
Springfield, O. & Bloom'g	Capt. Geo. Elliott		Beloford, Ind.
Belleville & Stone Shoe	H. D. Landis	H. D. Landis	Belleville, N. Y.
Washington & Annapolis	H. D. Landis		Rutland, Vt.
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Boston & Albany		Wm. B. Weston	Springfield, Mass.
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Burlington & Missouri River in Neb.		D. Hawksworth	Plattsmouth, Neb.
Burlington & Cape & Nor.		W. H. Hays	Burlington, Vt.
Burlington & Southwestern	A. B. Allen		Farmington, Ia.
Buffalo & Southwestern	J. G. Hubbard		Buffalo, N. Y.
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[JULY, 1881]

Railroad.	Master Mechanic.	Master Car-Builder.	Residence.
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Albion & St. Louis	J. H. Smith	Albion, Ill.	New York, Penn. & Ohio
Indianapolis, Decatur & Springfield	Dulaski Leeds	Indianapolis, Ind.	New York, Penn. & Ohio
Indianapolis, Peru & Chicago	John McKenna	Indianapolis, Ind.	New York, Penn. & Ohio
Indianapolis, St. Louis & Chicago	J. J. Sankers	Indianapolis, Ind.	New York, Penn. & Ohio
Indiana, Bloomington & Western	J. S. Porter	Indianapolis, Ind.	New York, Penn. & Ohio
International & Great Northern	H. H. Sessions	Sandusky, Ohio	New York, Penn. & Ohio
Iron	H. A. Whitney	Palestine, Tex.	New York, Penn. & Ohio
Iron	Perry Scott	Clem Shaffer	New York, Penn. & Ohio
Jacksonville, Pensacola & Mobile	J. D. Hollister	Tallahassee, Fla.	New York, Penn. & Ohio
Jeffersonville, Mad. & Indianapolis	Wm. Swanson	Jeffersonville, Ind.	New York, Penn. & Ohio
Johnsonville, N. W. & S. E. Ast.	P. T. Buttery	Johnsonville, Ill.	New York, Penn. & Ohio
Joplin	P. T. Buttery	Johnsonville, Ill.	New York, Penn. & Ohio
Knoxton & Breakwater	A. J. Macneuz	Johnsonville, Ill.	New York, Penn. & Ohio
Kansas City, Fort Scott & Gulf	J. S. McCrum	Kansas City, Mo.	New York, Penn. & Ohio
Kansas City, Lawrence & South	J. S. McCrum	Kansas City, Mo.	New York, Penn. & Ohio
Kan. City, St. Joe & Conn. River	Wm. McCall	St. Joseph, Mo.	New York, Penn. & Ohio
Kansas Central	John Macneuz	St. Joseph, Mo.	New York, Penn. & Ohio
Kaw Valley Division	R. T. Roberts	St. Joseph, Mo.	New York, Penn. & Ohio
Smoky Hill Division	John B. Daily	St. Joseph, Mo.	New York, Penn. & Ohio
Denver Division	Wm. Ogden	St. Joseph, Mo.	New York, Penn. & Ohio
R. R. Ledyard	J. H. Haskethorn	St. Joseph, Mo.	New York, Penn. & Ohio
Kentucky Central	Wm. A. Field	St. Joseph, Mo.	New York, Penn. & Ohio
Knox & Lincoln	Wm. A. Field	St. Joseph, Mo.	New York, Penn. & Ohio
Lake Erie & Western	H. L. Coper	Lima, Ohio	New York, Penn. & Ohio
Lake Ontario Southern	George Thompson	Lima, Ohio	New York, Penn. & Ohio
Lake Shore & Michigan Southern	James Sedgley	Lima, Ohio	New York, Penn. & Ohio
Michigan Southern Division	John Kirby	Lima, Ohio	New York, Penn. & Ohio
Toledo Division	J. M. Sanborn	Elkhart, Ind.	New York, Penn. & Ohio
Erie Division	L. O. Gasset	Elkhart, Ind.	New York, Penn. & Ohio
Buffalo Division	J. E. Graham	Elkhart, Ind.	New York, Penn. & Ohio
Lehigh Valley	John E. Kinney	Elkhart, Ind.	New York, Penn. & Ohio
Lehigh Valley	P. H. Hoke	Elkhart, Ind.	New York, Penn. & Ohio
Lehigh Valley	John Campbell	Elkhart, Ind.	New York, Penn. & Ohio
Lehigh Valley	D. Clark	Elkhart, Ind.	New York, Penn. & Ohio
Lehigh Valley	A. Mitchell	Elkhart, Ind.	New York, Penn. & Ohio
Lehigh Valley	Jno. S. Lentz	Elkhart, Ind.	New York, Penn. & Ohio
Little Rock, Miss. River & Texas	James Ehlert	Elkhart, Ind.	New York, Penn. & Ohio
Los Angeles & Independence	Jas. Volz	Elkhart, Ind.	New York, Penn. & Ohio
Louisville, New Albany & Chicago	J. S. Young	Elkhart, Ind.	New York, Penn. & Ohio
Long Island	Jas. Thompson	Elkhart, Ind.	New York, Penn. & Ohio
Louisville, Cincinnati & Lexington	B. Harrop	Elkhart, Ind.	New York, Penn. & Ohio
Louisville & Nashville	A. Schaefer	Elkhart, Ind.	New York, Penn. & Ohio
Nashville & Decatur Div.	Reuben Wells	Elkhart, Ind.	New York, Penn. & Ohio
South & North Div.	C. W. White	Elkhart, Ind.	New York, Penn. & Ohio
Clarksville Division	Thos. Walsh	Elkhart, Ind.	New York, Penn. & Ohio
Memphis & Ohio Div.	Wm. Pike	Elkhart, Ind.	New York, Penn. & Ohio
Mobile & New Orleans Div.	Wm. Adair	Elkhart, Ind.	New York, Penn. & Ohio
Macon & Brunswick	R. Wagon	Elkhart, Ind.	New York, Penn. & Ohio
Manassas & Washington	J. W. Philbrick	Elkhart, Ind.	New York, Penn. & Ohio
Maine Central	J. T. Gordon	Elkhart, Ind.	New York, Penn. & Ohio
Manchester & Lawrence	T. W. Peoples	Elkhart, Ind.	New York, Penn. & Ohio
Manhattan Beach	M. Bosley	Elkhart, Ind.	New York, Penn. & Ohio
Marquette Elevated	G. M. Taylor	Elkhart, Ind.	New York, Penn. & Ohio
Marquette, Houghton & Ontonagon	M. T. Taylor	Elkhart, Ind.	New York, Penn. & Ohio
Memphis, Paducah & Northern	P. Twichell	Elkhart, Ind.	New York, Penn. & Ohio
Memphis & Little Rock	J. H. Munro	Elkhart, Ind.	New York, Penn. & Ohio
Memphis & Charleston	J. H. Munro	Elkhart, Ind.	New York, Penn. & Ohio
Mobile & National	J. H. Munro	Elkhart, Ind.	New York, Penn. & Ohio
Michigan Central	J. H. Munro	Elkhart, Ind.	New York, Penn. & Ohio
Midland of New Jersey	W. C. Ennis	Elkhart, Ind.	New York, Penn. & Ohio
Midland, Lake Shore & West N.	S. Charney	Elkhart, Ind.	New York, Penn. & Ohio
Missouri Pacific	Thos. Downing	Elkhart, Ind.	New York, Penn. & Ohio
Missouri Pacific	Thos. Downing	Elkhart	New York, Penn. & Ohio
Missouri Pacific	J. C. Ramsey	St. Joseph, Mo.	New York, Penn. & Ohio
Missouri Pacific	John Hewitt	St. Joseph, Mo.	New York, Penn. & Ohio
Missouri Pacific	John Hewitt	St. Joseph, Mo.	New York, Penn. & Ohio
Missouri Pacific	Geo. W. Waishie	St. Louis, Mo.	New York, Penn. & Ohio
Missouri Pacific	H. Faries	St. Louis, Mo.	New York, Penn. & Ohio
Mobile & Montgomery	R. W. Lewis	Montgomery, Ala.	New York, Penn. & Ohio
Mobile & Girard	J. C. Albrecht	Whistler, Ala.	New York, Penn. & Ohio
Mobile & Ohio	R. W. Lewis	Whistler, Ala.	New York, Penn. & Ohio
Mobile & Ohio	John Fitzgerald	Whistler, Ala.	New York, Penn. & Ohio
Mobile & Ohio	T. Carson	Whistler, Ala.	New York, Penn. & Ohio
Montgomery & Eufaula	J. W. Knight	Whistler, Ala.	New York, Penn. & Ohio
Morgan's Louisiana & Texas	N. Tilton	Whistler, Ala.	New York, Penn. & Ohio
Nashua & Lowell	S. A. Davis	Nashua, N. H.	New York, Penn. & Ohio
Nashville, Chattanooga & St. Louis	James Culley	Nashua, N. H.	New York, Penn. & Ohio
Nauvoo, Utah	Henry Hanford	Nashua, N. H.	New York, Penn. & Ohio
Norfolk	Wm. Sutcliffe	Nashua, N. H.	New York, Penn. & Ohio
Newburg, Dutchess & Connecticut	W. J. Vanhuskirk	Nashua, N. H.	New York, Penn. & Ohio
New Brunswick & Canada	Thos. Armstrong	Nashua, N. H.	New York, Penn. & Ohio
New Haven & Northampton	Henry Fox	Nashua, N. H.	New York, Penn. & Ohio
New Jersey & New York	John Sweeney	Nashua, N. H.	New York, Penn. & Ohio
New York Southern	Henry Blodgett	Nashua, N. H.	New York, Penn. & Ohio
New York, Lake Erie & Western	J. H. Vreeland	Nashua, N. H.	New York, Penn. & Ohio
New York, Lake Erie & Western	J. Van Vechten	Nashua, N. H.	New York, Penn. & Ohio
New York, Lake Erie & Western	Y. Blackburn	Nashua, N. H.	New York, Penn. & Ohio
New York, Lake Erie & Western	George H. Griggs	Nashua, N. H.	New York, Penn. & Ohio
New York, Lake Erie & Western	Geo. W. Waishie	Nashua, N. H.	New York, Penn. & Ohio
New York, Lake Erie & Western	Thos. Wheeler	Nashua, N. H.	New York, Penn. & Ohio
New York & Harlem	C. E. Garey	Nashua, N. H.	New York, Penn. & Ohio
New York Central & Hudson River	Wm. Buchanan	Nashua, N. H.	New York, Penn. & Ohio
New York Central Division	Henry W. Ford	Nashua, N. H.	New York, Penn. & Ohio
New York Central Division	Henry W. Ford	Nashua, N. H.	New York, Penn. & Ohio
New York Central Division	Wm. Bud	Nashua, N. H.	New York, Penn. & Ohio
New York Central Division	Wm. Bud	Nashua, N. H.	New York, Penn. & Ohio
New York, Ontario & Western	Edw. Minch	Nashua, N. H.	New York, Penn. & Ohio
New York & New England	Edw. Minch	Nashua, N. H.	New York, Penn. & Ohio
Norfolk & Worcester Div.	Edw. Minch	Nashua, N. H.	New York, Penn. & Ohio
New York, N. Haven & Hartford	J. H. Kettledore	Nashua, N. H.	New York, Penn. & Ohio
Norfolk & Worcester Div.	J. H. Kettledore	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
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New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J. A. Cooper	Nashua, N. H.	New York, Penn. & Ohio
New York, Penn. & Ohio	J.		



Railroad.	Master Mechanic.	Master Car Builder.	Residence.
Spartanburg, Union & Columbia	Wm. Platt	W. B. Brown	Spartanburg, S. C.
Springfield Southern	F. W. Johnston		Springfield, O.
State Line & Sullivan	J. O. Bright		Towanda, Pa.
Stockton & Copperopolis	M. S. Webb	M. S. Webb	Stockton, Cal.
St. Croix & Penobscot	G. H. Cousen	H. C. Tricker	Milltown, Me.
St. Joins	Jas. M. Owens		St. Augustine, Fla.
St. Johnsbury & Lake Champlain	Geo. E. Howe		St. Johnsbury, Vt.
St. Joseph & Des Moines	F. A. Chase		St. Joseph, Mo.
St. Joseph & Western	E. Sleepy	E. Sleepy	So. St. Joseph, Mo.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada
St. Louis Iron Mount & So.	W. A. Haynes	Oscar Doodlette	St. Louis, Mo.
Arkansas Division	L. Finlay	L. Finlay	Little Rock, Ark.
Missouri Division	W. H. Harris	H. M. Aldrich	De Soto, Mo.
St. Louis, Alton & Terre Haute	Thomas Everson	A. W. Grossvorn	St. Louis, Mo.
St. Louis, Salem & Little Rock	M. Kearney	M. Kearney	Springfield, Mo.
St. Louis & San Francisco	Wm. Foley		Kokomo, Iowa
St. Louis, Keokuk & Northwest	R. H. Smith		St. Louis, Mo.
St. Paul & Duluth	W. McFarland	John Hill	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	A. Ackerly		St. Paul, Minn.
St. Paul & Sioux City	Matt Ellis		Shakopee, Minn.
Sussex & Blairtown	E. H. Osborn	R. L. Sutton	Newton, N. J.
Syracuse, Binghamton & N. Y.	James Buchanan	James Buchanan	Syracuse, N. Y.
Syracuse, Chesapeake & New York	Geo. W. West	Wm. J. McMichael	Syracuse, N. Y.
T			
Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
T. H. & Indianapolis (Vandalia)	R. C. Pettie	E. D. Carter	Terre Haute, Ind.
Indianapolis Div. Line	Clifton Idler		Indianapolis, Ind.
Vandalia Div.	Chas. Butler		Effingham, Ill.
Locustport Division	A. W. Quackenbush		Logansport, Ind.
Texas & New Orleans	D. C. Smith	J. M. Mather	Houston, Texas
Texas & Pacific	H. J. Small	H. H. Sessions	Marshall, Texas
Brazos Division	J. F. Sechler		Dallas, Tex.
Tinaja	Pere Bonny	D. H. Stratton	Blossburg, Pa.
Toledo, Delphos & Burlington	F. M. Mast		Delphos, O.
Toronto, Grey & Bruce	David Preston		Toronto, Can.
Toronto & Nipissing	J. Haggas		Toronto, Can.
Troy & Boston	Z. B. Davis	R. V. Coon	Troy, N. Y.
U			
Ulster & Delaware	J. B. Dykeman	Jno. H. Decker	Rondout, N. Y.
Union Pacific	I. H. Congdon	Geo. E. Stevens	Omaha, Neb.
V			
Valley	B. C. Brewster	Chas. Blanchard	Cleveland, O.
Vicksburg & Meridian	Jas. B. Browne		Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	W. Bell Smith	W. Bell Smith	Monroe, La.
Virginia & Truckee	L. N. Fordling		Carsen, Nev.
Virginia Midland	J. E. Wadley	J. T. Nallo	Alexandria, Va.
W			
Wabash, St. Louis & Pacific	Channey E. Morris		Fort Wayne, Ind.
Wabash, St. Louis & Pacific	Jacob Johann	B. B. Rose	Springfield, Ill.
Wabash, St. Louis & Pacific	W. O. Hewitt	R. M. Hemphill	Peoria, Ill.
Wabash, St. Louis & Pacific	U. B. Kohler		Toledo, Ohio
Wabash, St. Louis & Pacific	J. S. Hazen		Stansbury, Mo.
Walsh, St. Louis & Pacific	C. S. Beck		Nottery, Mo.
Walkill Valley	John Dykeman	Jno. H. Decker	Rondout, N. Y.
Washington & Ohio	Edward Dunn	John Harrison	Alexandria, Va.
Welland	James Taylor	Wm. H. Pay	St. Catharines, C. W.
Westchester & Philadelphia	S. D. Danfield	S. D. Danfield	Cester, Pa.
Western & Atlantic	John H. Flynn	W. G. Grambling	Atlanta, Ga.
Western Maryland	David Holtz	J. H. Nussear	Union Bridge, Md.
Western North Carolina	Geo. W. King	F. M. Wade	Montgomery, Ala.
Western of Alabama	Robert King	F. M. Wade	Montgomery, Ala.
Western R. R. N. C.	Isaac W. Clark	Isaac W. Clark	Fayetteville, N. C.
Western Union	John Taylor	E. A. Edly	Racine, Wis.
West Feliciana	J. A. Tilton	J. A. Tilton	Bayou Sara, La.
West Jersey	W. McDaniel	C. C. Williams	Camden, N. J.
White Water	W. H. Wingert		Harrison, O.
Wilmington, Columbia & Augusta	John Bisset	W. H. Day	Florence, S. C.
Wilmington & Weiden	John Bisset	C. E. Clowe	Wilmington, N. C.
Wisconsin Central	Ed. B. Henney	J. B. Henney	Stevens Pt., Wis.
Wisconsin Valley	A. B. Snyder		Tomah, Wis.
Worcester & Nashua	John G. Brady	John G. Brady	Worcester, Mass.

IN THE  
**PATENT FIGHT**  
BETWEEN  
**D. A. HOPKINS, of 113 Liberty St., N. Y.**  
PATENTEE AND MANUFACTURER OF  
**SELF-FITTING JOURNAL BEARINGS**  
AND  
**T. V. LE ROY,**  
A DECISION HAS JUST BEEN RENDERED  
IN FAVOR OF HOPKINS.



# Directory of Railway Superintendents and Purchasing Agents THROUGHOUT THE UNITED STATES AND CANADA.

REFERENCES.—General Manager. \* General Superintendent. † Assistant General Superintendent. ‡ Assistant Superintendent. § Superintendent of Transportation. ¶ Assistant General Manager.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Adirondack.	G. E. Durkee.		Saratoga, N. Y.
Alabama Central.	John M. Bridges.		Selma, Ala.
Alabama Great Southern.	John Scott.	R. W. Healey.	Chattanooga, Tenn.
Alabama Great Southern.	Chas. B. Wallace.		Chattanooga, Tenn.
Albany & Susquehanna.	Ac. F. Young.		Honesdale, Pa.
Allegheny Valley.	David McCargo.	David McCargo.	Pittsburg, Pa.
Anderson, Lebanon & St. Louis.	Jas. Larned.		Anderson, Ind.
Arkansas Midland.	* A. H. Johnson.		Helena, Ark.
Asheville & Spartanburg.	James Anderson.		Spartanburg, S. C.
Astoria & Tillamook.	J. B. McCoy.		Astoria, O.
Atchison, Topeka & Santa Fe.	* W. B. Strong.	F. M. Smith.	Topeka, Kan.
Southern Division.	A. A. Robinson.		Las Vegas, N. M.
Eastern Division.	D. J. Chase.		Topeka, Kan.
Atlanta & Charlotte Air Line.	* G. J. Foreacre.	G. J. Foreacre.	Atlanta, Ga.
Atlanta & West Point.	* H. P. Grant.		Atlanta, Ga.
Atlantic & North Carolina.	A. B. Andrews.		Newbern, N. C.
Atlantic & Pacific.	F. W. Smith.	H. C. Nutt.	Albuquerque, N. M.
Atlantic, Tennessee & Ohio.	A. J. J. Gormley.		Charlotte, N. C.
Baltimore & Ohio.	* W. M. Clements.	S. S. Hill.	Baltimore, Md.
Ohio & Chicago Division.	W. C. Quincy.		Newark, N. J.
Pittsburg Division.	Theo. N. King.		Pittsburg, O.
Bangor & Piscataquis.	Arthur Brown.		Bangor, Me.
Bath & Hammondsport.	N. H. Hall.		Bangor, N. Y.
Bedford, Sperryville, Oronoke & Md.	Jas. W. Kennedy.	Jas. W. Kennedy.	Bedford, Ind.
Belleville & Snow Shoe.	Daniel Rhoads.		Belleville, Pa.
Bell's Gap.	Robert G. Ford.		Belleville, Pa.
Bell R. & Stock Yard.	* M. A. Downing.	M. A. Downing.	Indianapolis, Ind.
Birmingham & Railroad.	F. C. White.		Tolland, Va.
Boston, Beverly Beach & Lynn.	E. H. Whorf.		Boston, Mass.
Boston & Albany.	* C. Russell.		Boston, Mass.
Boston & Albany.	Jos. H. Franklin.		Boston, Mass.
Boston & Providence.	A. A. Folsom.		New Haven, Conn.
Boston Concord & Montreal.	J. A. Dodge.		Plymouth, N. H.
Boston, Concord & Montreal.	J. A. Dodge.	J. Thomas Vose.	Boston, Mass.
Boston, Housatonic & Western.	E. B. Burnham.		Mechanicville, N. Y.
Boston & Lowell.	J. T. Furber.	J. T. Furber.	Boston, Mass.
Boston, Barre & Gardner.	H. M. Witter.	H. M. Witter.	Worcester, Mass.
Bradford, Bonded & Kinross.	R. C. Williams.		Brooklyn, N. Y.
Brooklyn, Flatbush & Coney Island.	W. E. Dorwin.		Brooklyn, N. Y.
Brunkow & Albany.	R. D. Meader.		Brunkow, N. Y.
Burlington & Mo. River (in Neb.).	A. E. Tondahl.	G. Hargreaves.	Omaha, Neb.
Burlington & Mo. River (in Neb.).	Geo. W. Holdridge.		Omaha, Neb.
Burlington, Cedar Rapids & N. O.	J. C. Ives.	Theo. Stuckney.	Cedar Rapids, Ia.
Burlington & Northwestern.	John F. Gerry.	John F. Gerry.	Burlington, Ia.
Burlington & Southwestern.	J. W. Smith.		Burlington, Ia.
Buffalo & Southwestern.	* John F. Moulton.		Buffalo, N. Y.
Buffalo, New York & Philadelphia.	Geo. S. Gatechell.	J. H. Pool.	Buffalo, N. Y.
Cairo & St. Louis.	Chas. Hamilton.		St. Louis, Mo.
Cairo & Vincennes.	Roswell Miller.	G. H. Lyman.	Cairo, Ill.
California Northern.	* M. A. Fillmore.		Sacramento, Cal.
Camden & Atlantic.	F. A. Lister.	F. A. Lister.	Camden, N. J.
Canada Central.	Arthur Bell.		Brooklyn, N. Y.
Canada Southern.	* Wm. F. Taylor.		Buffalo, N. Y.
Canada Southern.	E. P. Murray.	A. F. Howland.	St. Thomas, Ont.
U. S. Division.	W. E. Carroll.		St. Thomas, Ont.
Canada Division.	W. E. Carroll.		St. Thomas, Ont.
Cape Fear & Yadkin Valley.	A. B. Stickney.	Geo. P. Nelson.	Winnipeg, Man.
Carolina Central.	V. Q. Johnson.	C. H. Roberts.	Wilmington, N. C.
Catawissa & Foggessville.	W. Chapman.	C. W. Chapman.	Catawissa, Pa.
Cayuga Southern.	W. Stevenson.		Savoy, Pa.
Cayuga & Susquehanna.	W. H. Humphrey.		Savoy, Pa.
Central Pacific.	* A. N. Towne.		San Francisco, Cal.
Central Pacific.	* A. N. Towne.		San Francisco, Cal.
Central Pacific.	* A. N. Towne.		San Francisco, Cal.
Western & Visalia Divisions.	A. D. Wilder.		Oakland, Cal.
Truckee Division.	Frank Tree.		Wardrobe, Nev.
Humboldt Division.	G. W. Oodington.		Carlin, Nev.
Salt Lake Division.	A. G. Fell.		Ogden, Utah.
Sacramento & Oregon Div.	R. H. Pratt.		Sacramento, Cal.
Central Vermont.	J. W. Hobart.		St. Albans, Vt.
Western Division.	John Schrier.		Ogdenburg, N. Y.
Rutland Division.	J. Burdett.		Rutland, Vt.
New London Northern.	G. W. Bentley.	G. W. Bentley.	New London, Conn.
Atlanta Division.	W. F. Shellman.		Macon, Ga.
Central Iowa.	D. N. Pickering.		Marshalltown, Ia.
Central of New Jersey.	James Moore.	R. W. Burnet.	Elizabeth, N. J.
Central of New Jersey.	W. W. Stearns.		Elizabeth, N. J.
Lehigh & Susq. Division.	W. S. Polhemus.		Scranton, Pa.
Charleston & Savannah.	C. S. Gadsden.		Charleston, S. C.
Charlotte, Columbia & Augusta.	G. R. Talcott.		Columbia, S. C.
Chesapeake & Ohio.	* C. W. Smith.		Richmond, Va.
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Des Moines & Iowa Division.	J. M. Murray.		Clinton, Iowa.
Winona & St. Peter Division.	J. M. Murray.		Clinton, Iowa.
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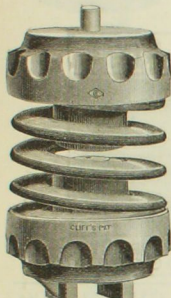






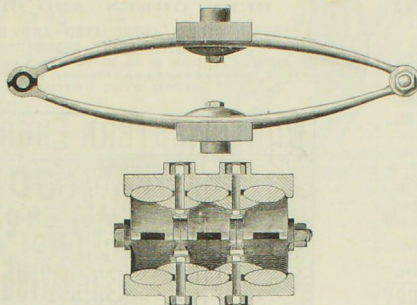


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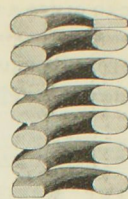


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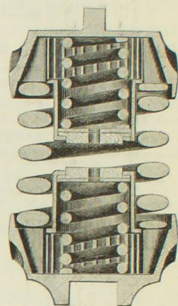
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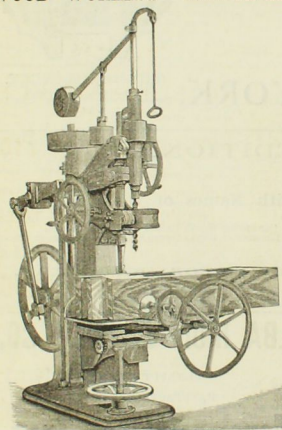
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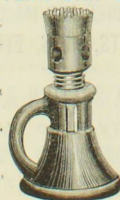
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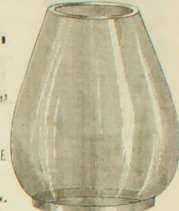
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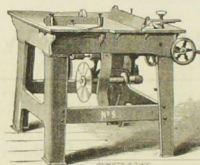
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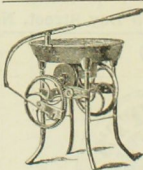
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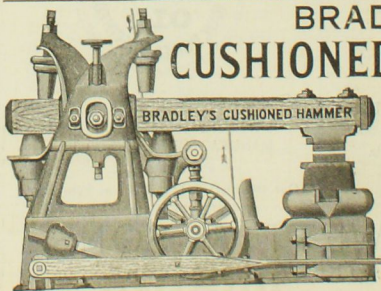
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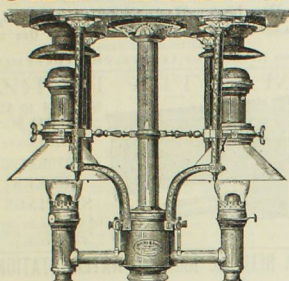
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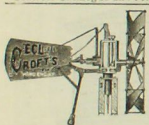
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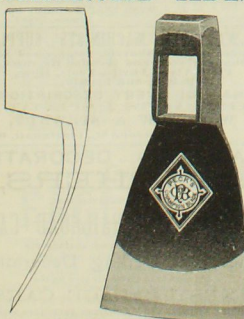
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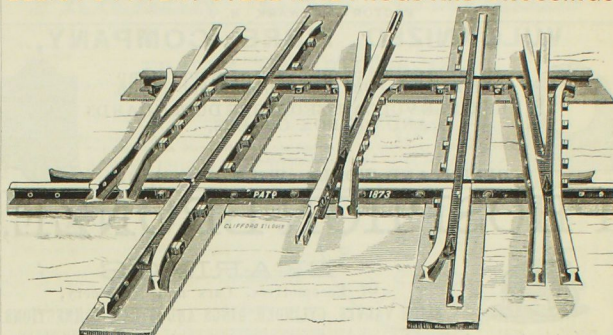
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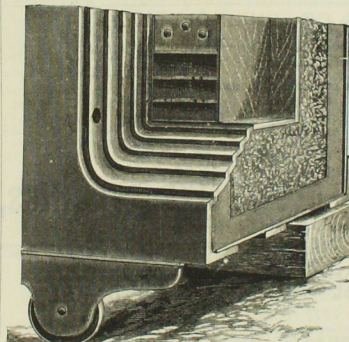
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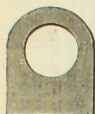
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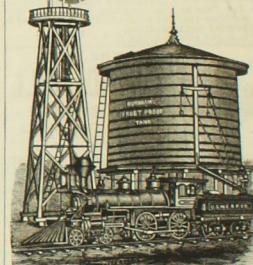
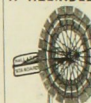
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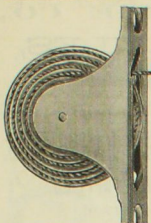
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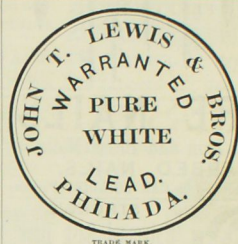
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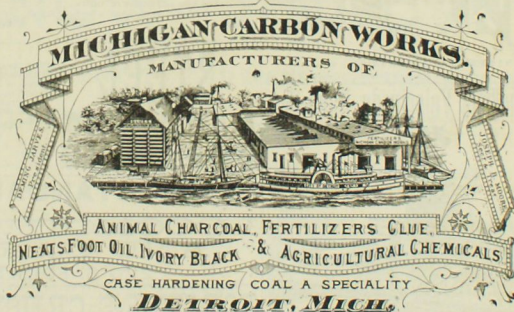


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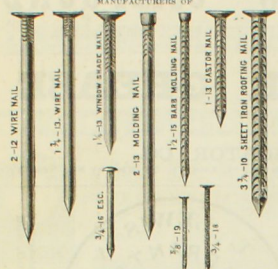
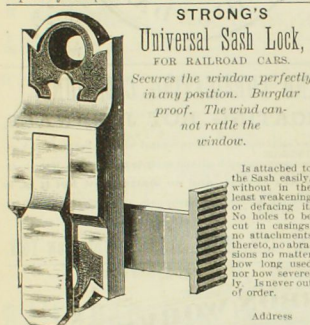
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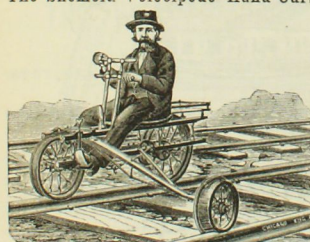
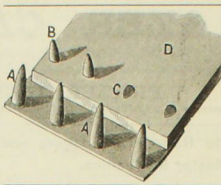
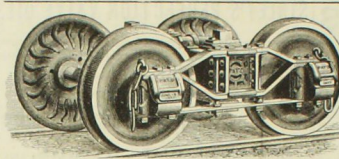
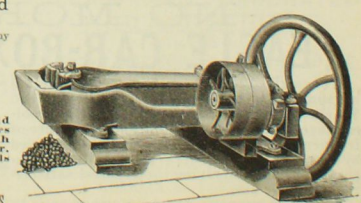
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[JULY, 1881.]

THE NATIONAL CAR-BUILDER.

XXV

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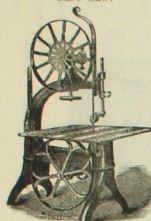
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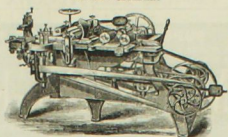
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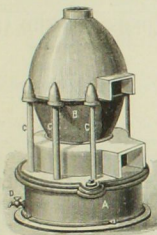


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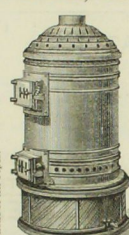
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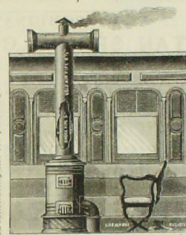
NO. 1.

No. 2. Shown with heater, and will burn either wood, coal, or kerosene. Thick of No. 2 and 3, and No. 3, is the same as No. 2, but with a different heater.



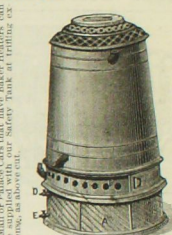
NO. 2.

No. 3. Designed for conducting hot air along the registers equally throughout the entire car, changing the temperature of the air, and thus keeping the car free from frost and vermin.



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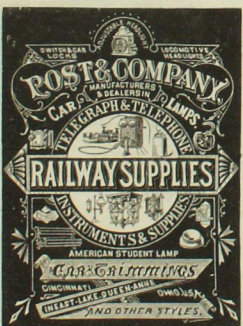
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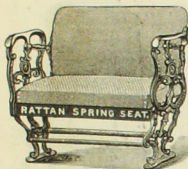
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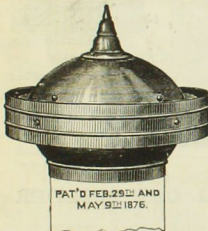
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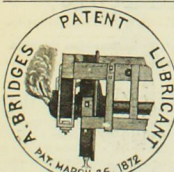
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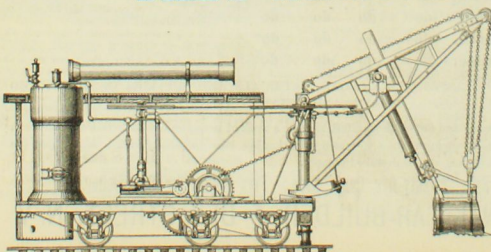
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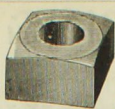
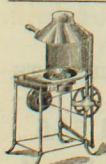
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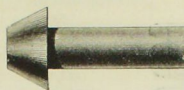
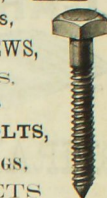
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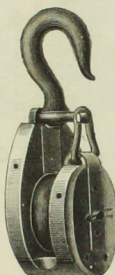
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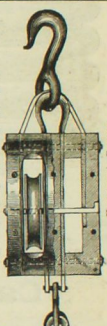


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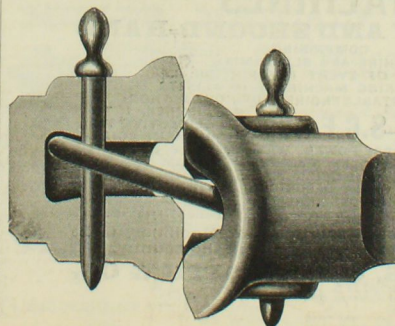
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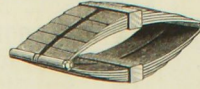
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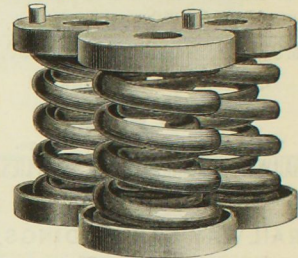
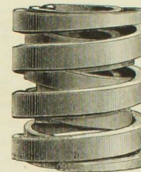
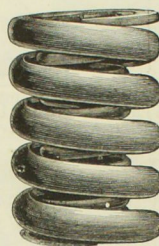
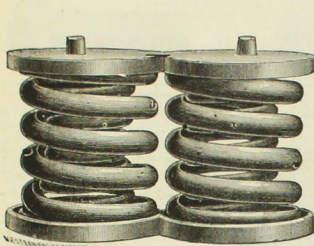
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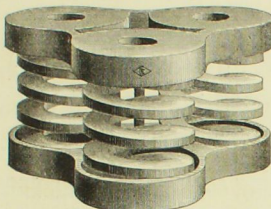
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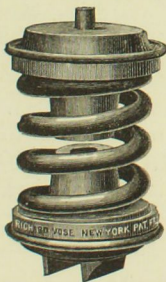
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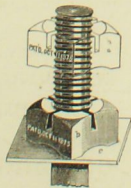
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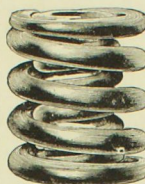
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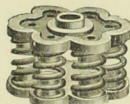
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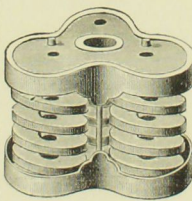
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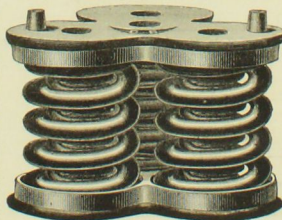
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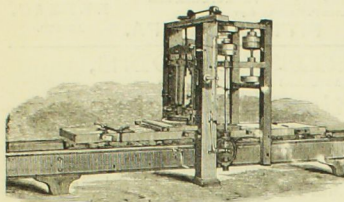
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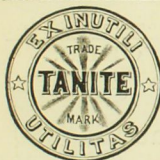


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